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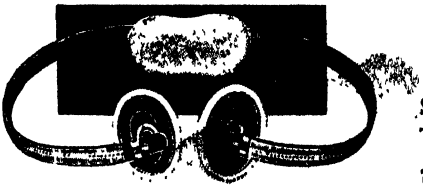

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THE DIAGNOSIS AND TREATMENT OF FIBROIDS

By VICTOR BONNEY, M.S., B.Sc., F.R.C.S., F.R.A.C.S.

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OF all the various neoplasms to which the human body is liable those composed of unstriped muscle and technically called leiomyomas are the commonest. Though leiomyomas may theoretically form in almost any situation where unstriped muscle tissue occurs, the uterus is the only place in which they are common—indeed probably about 99 per cent. of all leiomyomas arise in that situation. Uterine leiomyomas are by long custom known as fibroids, a meaningless term but useful on account of its brevity and its implication that the tumour springs from the uterus.

GENERAL CONSIDERATIONS

Clinically fibroids are exceedingly rare in women still in their teens and very uncommon in those under 25, but from that age onwards their frequency of incidence increases until between the forties and fifties, if seedlings as well as developed tumours be included, a considerable proportion of women have them. After the climacteric they cease to be formed and this rule seems to be without exception, for although fibroids are frequently first discovered in women who have passed " the change," the beginnings of the tumours have been laid down before it. The age incidence of clinically discoverable fibroids is not the same thing as the age incidence of their initiation, because at this stage they are too small to present physical signs. Various considerations suggest that the large majority of fibroids are laid down within the five years between 28 and 33. They begin as seedlings no bigger than a large pin's head and at first grow so slowly that, as a rule, not less than five to seven years pass before they are large enough to cause symptoms and present physical signs. As a result the commonest period in which fibroids are discovered is that between 38 and 45 years of age, from which it follows that a woman over 40 whose uterus on pelvic examination presents no sign of a fibroid is very unlikely subsequently to grow one.

As has been stated, fibroids are very occasionally met with in quite young women. I once removed 92 of them from the uterus of a girl of 19. In a case such as this the tumours must have been initiated very soon after puberty. Such precocious development of fibroids implies an abnormal state of the uterine wall—a premature agedness, in fact.

Fibroids may arise in any part of the uterus as well as in the unstriped muscular extensions from it, namely, the round ligaments, the ovario-uterine ligaments, the unstriped fibres scattered in the broad ligaments, the vaginal wall and the cardinal ligaments. The body of the uterus is by far the commonest site, and after this the supravaginal cervix, whereas the vaginal cervix and the other situations mentioned are as seats of origin more or less rare.

Fibroids are more often multiple than solitary. Of the 632 patients on whom I have performed myomectomy the tumours were solitary 254 times and multiple 378 times.

The amount of uterine distortion depends on the situation of the tumour or tumours. A solitary tumour growing just under the endometrium produces a perfectly symmetrical and smooth enlargement; but in all other situations a protuberance or knob or boss is the result. The consistence of the mass felt on examination varies. As a rule it is hard and firm, and sometimes when calcification has occurred, absolutely rocky. Certain forms of degeneration, however, cause a fibroid to become soft or almost fluctuant on palpation, and when this change is accompanied by high vascularity (nævoid degeneration) auscultation may sometimes reveal a souffle as in pregnancy. Fibroids in this condition may enlarge at each period and shrink again after it is over.

Fibroids are not in the least tender or painful in ordinary circumstances, but inflammation, torsion, or the supervention of acute " red " degeneration makes them so.

DIAGNOSIS

Pregnancy.—Normal pregnancy is accompanied by amenorrhœa, "normal" fibroids by menorrhagia, or at least no diminution of the menstrual flow. It is not, however, uncommon to meet with patients in whom pregnancy is accompanied, not by amenorrhœa, but with recurring losses of blood, mistaken by the woman for her periods. I call this " hæmorrhagic pregnancy " and it may easily be mistaken for fibroids, and the more so because the patient does not believe herself pregnant. If time be allowed, the appearance of fœtal signs will presently disclose the state of affairs, but it sometimes happens that the fœtus dies before the fifth month and is retained within the uterus. The likeness to a fibroid is then very close both on account of the history of bleeding and because the retained pregnancy as it shrinks loses the characteristic softish feel and becomes hard. Moreover, the Aschheim-Zondek test may be negative. In such a case a consideration of the duration of the symptoms is helpful, for with pregnancy the abnormal bleeding will only have persisted for a length of time commensurate with the duration of the pregnancy, whereas a fibroid the size of a four months' gestation must have been growing for several years and the history of menstrual disturbance will in all probability be much longer than four months. I have seen many blood moles operated on under the mistaken diagnosis of fibroids.

The contour of the pregnant uterus is generally smooth, whereas with fibroids this is only so when the tumour is submucous and solitary. Occasionally the ovum implants itself in one of the uterine cornua (angular pregnancy) and then in the earlier months of gestation the uterus may be markedly asymmetrical, and the one-sided bulge simulates a fibroid. The accompanying amenorrhœa and, if necessary, the result of an Aschheim-Zondek test should disclose the nature of the condition. Extra-uterine pregnancy in its acute form can scarcely be mistaken for fibroids, but it is otherwise with a long-retained tubal mole accompanied perhaps by an hæmatocele. As with the cases of hæmorrhagic pregnancy just mentioned, so here a history of amenorrhœa may not be forthcoming but on the contrary that of irregular or continued uterine bleeding. Moreover the mass formed by the blood outside the uterus is hard enough to simulate a fibroid and, further, it is inseparable from the uterus. An Aschheim-Zondek test will probably be negative. The clue to the problem is again, if it be pregnancy, the short duration of symptoms in contrast to their long duration if it be fibroids, and a further fact is that pain is the rule in cases of extra-uterine gestation whilst with fibroids it is the exception.

Uterine "fibrosis."—Under this term are assembled together the various conditions not dependent on a neoplasm which give rise to uterine bleeding. In some of these histological changes have taken place in the uterine wall while in others they are not discoverable, the symptoms being held to be due to disordered endocrine influence. In some cases of " fibrosis " the uterus is definitely larger than normal, but in others the organ is not enlarged, or is even smaller than normal. The diagnosis has to be made between this condition and a submucous fibroid only slightly or not discoverably enlarging the uterus, and in many instances it is impossible, short of an exploratory dilatation of the cervix, to decide between the two. The commonest of the conditions which come under the head of " fibrosis " is that brought about by chronic subinvolution. Most of the patients thus afflicted have had a number of children, the last often quite recently in relation to the onset of the bleeding, whereas patients suffering from fibroids are frequently childless or, if they have had children, have at least not conceived for many years prior to the onset of symptoms.

Ovarian blood (" chocolate ") cysts.—These are frequently mistaken for fibroids. Modern research has shown that these cysts are in many cases produced by the growth in the ovary of islands of tissue indistinguishable in appearance from uterine endometrium and like it possessing the faculty of menstruating. The blood so exuded accumulates to form a cyst or cysts and owing to its retention is converted into a thick dark liquid, identical with that distending the vagina in cases of hæmatocolpos. Both ovaries are affected in a large proportion of cases and in addition there occurs a thickening of the posterior pelvic peritoneum due to the growth in it of islands of tissue having endometrial structure. This leads to dense adhesions—fusions, in fact—between the parts occupying the area, and the result is a conglomerate mass, bossy in outline, with which the uterus appears to blend and therefore on palpation closely resembling the mass formed by multiple fibroids. The average age of patients suffering from blood cysts is between 30 and 45, not greatly different from that of fibroids, and menorrhagia is not an uncommon accompaniment though by no means constant. The principal difference in the clinical histories of the two conditions relates to pain, blood cysts being almost constantly so associated, whereas with fibroids pain is uncommon although, when it does occur, it most often takes the form of monthly pain, which is also the type of pain caused by blood cysts. There is one very characteristic feature of blood cysts, namely, a nodular thickening on the front wall of the pouch of Douglas which can be felt through the posterior vaginal fornix. The finding of this together with a sensation of fixity suggesting adhesions points strongly to a diagnosis of blood cysts. It is not uncommon for the two conditions to co-exist.

Chronic inflammatory disease of the appendages.—Long-continued subacute inflammation of the uterine appendages produces a mass which may be mistaken for fibroids. There is, however, more or less severe pain, which is unusual with fibroids and moreover the clinical history is short whereas that of fibroids is long as a rule.

Ovarian tumours.—Ovarian cysts apart from their different average consistency are usually distinguishable from fibroids by the fact that the uterus can be felt apart from the swelling. The menstrual histories are also different, the former being accompanied by scanty or absent menstruation, whilst with the latter the reverse obtains with such constancy that if a fibroid is associated with amenorrhœa in a woman of child-bearing age it is almost certain that the uterus contains a pregnancy as well. Ovarian fibromas feel as hard as fibroids, but the other differences remain. Malignant ovarian growths, on the other hand, may simulate fibroids much more closely, the tumour being usually inseparable by touch from the uterus and being more or less solid to the feel. The larger number of these growths, however, arise in women past the climacteric and their clinical history dates from after that event. Whereas, although fibroids are sometimes discovered at the same advanced age, questioning the patient nearly always elicits the fact that she used to suffer from menorrhagia and had an unusually late menopause. Most of the " fibroids " diagnosed for the first time after " the change " turn out not to be fibroids but malignant disease.

Malignant disease of the body of the uterus.—It is unusual for carcinoma to enlarge the body of the uterus to a size comparable with the enlargement that fibroids cause. It does, however, occasionally do so and further sometimes produces bosses and nodules which lend colour to the mistaken diagnosis. On the other hand the bleeding, more or less continuous but small in quantity, is not in the least like the free but intermittent hæmorrhages caused by fibroids. Further, there is continual discharge, which fibroids of themselves never cause. Fibroids and carcinoma of the corpus are often found together and the mass then felt is typical of fibroids although the symptoms (bleeding and discharge) are those typical of cancer. The diagnosis is ordinarily easy, but occasional cases of carcinoma of the body are met with in which bleeding and discharge do not occur at all until a late stage and if fibroids co-exist they alone will be diagnosed. Sarcoma of the uterus generally arises in a pre-existent fibroid, the frequency of this metamorphosis having been estimated as high as 2 per cent. for all cases of fibroids operated on. Sarcomatous metamorphosis of a fibroid is difficult to diagnose. Rapid growth and pain in a tumour whose presence was known beforehand may suggest the change, but on the other hand certain of the innocent degenerations to which fibroids are liable—notably nævoid degeneration—present the same picture. Primary sarcoma of the uterine wall causes a rapid enlargement of the organ accompanied by bleeding which is sooner or later continuous, and a discharge presently appears. Its features are, therefore, like those of carcinoma of the body supervening on a uterus already enlarged by fibroids. An accurate diagnosis is impossible though the indication for immediate operation is clear enough. *Retroflexion of the uterus.*—The body of a retroflexed uterus is easily mistaken for a fibroid lying behind a retroverted uterus, especially when the retroflexed uterus is the subject of that form of " fibrosis " which enlarges it. The mistake is usually made in cases in which the patient is too obese to allow a satisfactory bimanual examination to be carried out. The use of the sound under an anæsthetic will reveal the true state of affairs.

TREATMENT

Fibroids giving rise to symptoms should be operated on, but small fibroids causing no symptoms and accidentally discovered in a woman whose climacteric is only a few years distant should be left alone if the diagnosis is certain. In the case of younger women this rule should not hold because when the climacteric is ten or more years distant it is practically certain that within that period the tumour or tumours will undergo considerable enlargement. Advice in favour of an operation should be given the more emphatically the younger the patient, and the operation advised should be myomectomy which leaves the woman " whole " and which is the more easily carried out the earlier the tumours are operated on.

Myomectomy.—To most patients hysterectomy is a disaster, and most of all so when sentiment is reinforced by a passionate desire to have children. The operation, therefore, may inflict a psychological wound that may remain unhealed throughout the patient's life. It is generally difficult to plumb the depths of a woman's feelings on such matters, and as a rule the surgeon has little or no knowledge wherewith to guide his decision. It follows, therefore, that operative removal of the fibroid or fibroids alone is the ideal treatment and modern technique now renders this feasible at an average lesser risk than hysterectomy in practically every case in which conservatism of the womb is desirable or desired. I have now performed this operation over 600 times with an operative mortality of 1·1 per cent. In the past, patients and their medical men have been discouraged against this most beneficent procedure by tales of its impossibility, or if possible, its risk, and by statements that the fibroids usually recur and that the conserved organ is useless for conception. Not one of these is true. The size of the tumour, the number of fibroids in the uterus, or their position in its wall is no bar to the practicability of the operation. The largest number of fibroids I have removed from a single uterus is 125, and I have removed more than 50 on a number of occasions. It can be argued that so long as the womb is in the body it may, up to the advent of the climacteric, produce fibroids. Theoretically this is so, but practically it is exceedingly rare for new fibroids to develop after myomectomy if the patient at the time of the operation was over 35 years of age for, as has already been pointed out, it appears that the seeds of nearly all fibroids are formed before that age. In my series of myomectomies new fibroids formed after the operation in only ten instances and in nearly all these cases the women were exceptionally young when they were operated on.

Among them may be cited two girls, one aged 19 and the other 23, from whose wombs I enucleated 92 and 53 fibroids respectively. Both these patients developed new tumours, the younger four years and the elder five years after their operations, and both had to undergo hysterectomy.

But it is in cases of young women like these that the desirability of saving the womb is greatest even if it be only to preserve their full marriageable value for a few years.

The patient from whom I removed 125 fibroids was an unmarried woman aged 34 at the time of her operation. She remained perfectly well for seven years but did not marry; menorrhagia then restarted and it was evident that new fibroids were present. She was then 41 and I performed hysterectomy.

As regards the prospect of pregnancy subsequent to the operation, there were among my cases 137 patients who being married and within the childbearing age wished for children. Of these, 52 or 38 per cent. conceived. The deliveries were natural 34 times, and by Cæsarean section 17 times, and there was one miscarriage. The frequency of the Cæsarean operation is due to the exceeding preciousness of the child to a mother no longer young, and not to any inability of the uterus to function normally in labour.

One among these cases deserves special mention. When she was 27 I removed 19 fibroids from her uterus and when she was 36 I operated again and removed six more. At 40 years of age she was delivered of her first child.

Hysterectomy.—While myomectomy is the ideal operation for fibroids there are many instances in which hysterectomy better meets the case. All women do not wish the uterus to be conserved. Some are so disturbed by the discomfort and illness their periods have caused them that they heartily wish the process stopped, and some do not wish for a child or any more children and welcome the preventive effect of hysterectomy. There are others who, being indifferent on the matter, leave the decision to the surgeon, who should then perform hysterectomy or myomectomy according to which seems to promise to be the easier operation. When a patient is profoundly anæmic, hysterectomy should be chosen, for such women are unfitted to undergo even the normal monthly loss of blood. In some cases of fibroids, the uterus, apart from the tumours, is unhealthy in itself, and in such circumstances should not be conserved unless the patient specially desires it. The combination of fibroids with that form of " fibrosis " which follows subinvolution is not uncommon, and hysterectomy in these cases is the more indicated because the patient already has a family.

There has been much argument whether hysterectomy performed for fibroids should be subtotal or total. I am of opinion that when the cervix is reasonably healthy it should not be removed for, though it is true that occasionally carcinoma develops in the cervical stump, the risk is very small, whereas the risk of total hysterectomy, even in expert hands, is definitely greater than that of the subtotal operation, and much greater when the operator is a person of small experience. Whichever of the two be carried out, both ovaries should be conserved unless very gross disease affects one or both of them. To remove these organs from a woman for mere operative convenience is most reprehensible.

Vaginal removal of fibroids.—Small fibroids, especially when polypoid, can be removed through the cervix but the number of cases suitable for this procedure is relatively small. In certain quarters, especially on the Continent, vaginal hysterectomy for quite large and frequently multiple fibroids is carried out. It requires for its safe accomplishment a high degree of skill, but even then it is in my opinion inferior to the abdominal operation.

Curetting.—This at best is a mere palliative and carries with it a risk of infecting the tumour or tumours: it should never be performed.

Radiological treatment.—At the period when I entered on gynæcology bilateral oophorectomy was still quite frequently carried out to stop the menorrhagia caused by fibroids. At that time hysterectomy was a formidable undertaking, with a mortality varying between 12 and 30 per cent. according to who performed it, and compared with it the removal of both ovaries was a safe procedure. The effect of the latter operation was as a rule to bring about an acute climacteric with immediate cessation of the periods, following which the tumour more or less slowly shrunk, though it never disappeared entirely. On occasions, however, not only did the tumour refuse to stop growing but the bleeding continued as well. The modern radiological treatment of fibroids, whether by X-rays or radium, is on a par with this discarded operation for it brings about an acute climacteric, the only difference being that the elimination of the ovaries by the modern method is bloodless and (to life) riskless. As with the old operation, so with radiological treatment, the extent of the climacteric symptoms varies with the individual. There are certain women the importance of whose ovarian secretions in the economy of their body is so little that their elimination, whether by the surgeon or the radiologist, makes no difference to their life; but there are others who suffer acutely, nor is it possible to forecast beforehand to which of the two classes the individual patient belongs. It is therefore a treatment not to be advised except for patients the state of whose heart, lungs or kidneys makes an operation really dangerous, or when in a woman closely approaching the climacteric there are circumstances suggesting to the expert that the operation is likely to prove formidable.

THE DIAGNOSIS AND TREATMENT OF EARLY MALIGNANT DISEASE OF THE UTERUS

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CANCER of the uterus forms about one third of all cancers in women and causes one death in 45 among women over 30. In 1934, 4,451 women died from this disease in England and Wales alone. In 1924 the death rate was 217 per million of women living; in 1934 the corresponding figure was 211. Little reduction in the death rate can therefore be claimed in spite of advances in treatment during the last ten years. This is to be attributed to the fact that cancer of the uterus is in its early stage symptomless, and in consequence 90 per cent. of patients still come as they did ten or more years ago when the disease is already so advanced that treatment is comparatively ineffective in so far as permanent cure is concerned. The disease may attack either the cervix or body of the uterus.

CANCER OF THE CERVIX

This accounts for about 90 per cent. of all uterine cancers.

Age incidence and parity.—At least 90 per cent. of cancers of the cervix occur in women who have been pregnant. It is therefore believed that an important predisposing cause is trauma and infection of the cervix at childbirth, with resulting cervicitis and irritating discharge. It is remarkable that few cases have been recorded in patients with complete prolapse —a common enough condition in parous women. Possibly this immunity is due to the fact that the discharge from the infected cervix in such cases easily escapes. As to age, the peak incidence is between 45 and 60, but it is not infrequent under 30 (4 per cent.) and over 70 (3 per cent.), and 14 cases have been recorded between 16 months and 20 years. No age is therefore exempt. It will be seen that the age incidence in cancer of the body of the uterus is distinctly different.

Pathological considerations.—The disease may arise in two distinct sites in the cervix :

(1) It may start on the outer surface of the vaginal portion of the cervix which is normally covered by squamous epithelium. Here it often begins in an erosion and may either form (*a*) a flat ulcer which invades and ultimately destroys the cervix or (*b*) a fungating cauliflower-like mass which may fill up the vaginal vault (everting or papillary form). These are both usually squamous epitheliomas but may be adenocancers. They are exposed to trauma and infection and therefore bleeding occurs comparatively early, followed by malodorous discharge. They are usually, especially the papillary form, easily diagnosed as they can be seen with the speculum.

(2) It may start in the cervical canal, arising there from the columnar epithelium lining the canal (endocervical cancer). This form invades the tissues of the cervix radially and thus the cervix becomes enlarged. It is usually a columnar-celled cancer, but sometimes a squamous epithelioma arises after squamous metaplasia of the columnar cells of the canal. As the growth lies within the canal it is protected from trauma and infection; bleeding is therefore late and on examining the cervix nothing may be evident in the early stages unless care is taken to examine the cervical canal carefully. Ultimately it becomes quite evident, for as the carcinomatous tissue breaks down a crater-like cavity is formed, triangular in shape, with the apex in the region of the internal os.

EARLY DIAGNOSIS

General considerations.—There are no early symptoms of cancer of the cervix and therein lies its greatest tragedy. By the time bleeding occurs the growth has already progressed to the stage of ulceration. The first symptom is usually hæmorrhage occurring between periods or after the menopause. The bleeding may be only a slight "spotting" which may be first noticed by the patient after coitus or douching, but sometimes the first bleeding is fairly free. Occasionally the first symptom is a watery or serous discharge which is apt to be disregarded if there has been, as is often the case, a muco-purulent vaginal discharge for some years. It cannot be too strongly emphasized that *intermenstrual* or *post-menopausal bleeding is always abnormal* and always calls for immediate investigation by the finger and speculum. Cachexia and pain are late symptoms. The patient with early cancer of the cervix is pain-free and usually looks ruddy and healthy.

The investigation.—As in all gynæcological investigations the examination should be carried out systematically so that nothing of importance may be overlooked.

History.—Start first of all with the history—the age—number of children, their ages, nature of confinements, miscarriages, the present complaint (in this case probably " bleeding from the front passage "), its duration and amount, and whether connected with any specific event, such as coitus or douching. Is there pain or loss of weight (in early cases there will not be either)? Now note the nature of the menstrual cycle, the age at puberty, the normal menstrual " type," the duration and frequency of the periods *now*, noting especially any increase in length or quantity, and finally the date of the last menstrual period (first and last day). This accurate ascertainment of the menstrual history is always of the greatest importance, but it is in this case especially so as an indication of possible fibroids (fibroid polyp and pregnancy with threatened abortion are common causes of irregular bleeding). Next inquire whether or not there has been any vaginal discharge or leucorrhœa ("the whites"), and, if so, its nature and duration. Usually it dates from a childbirth and indicates a torn and infected cervix, which, as has been seen, is an important predisposing cause of cancer. Inquiries regarding the condition of the bowels (pain, constipation) and bladder (frequency, pain, incontinence) usually complete the history. In early cancer of the cervix these will not be affected.

External examination.—In early cancer of the uterus there will be no recognizable evidence of its presence on external examination—no wasting, no anæmia and, of course, no abnormality evident in the abdomen.

Vaginal examination.—This is all-important in diagnosis and should never be neglected. It should be made in the first instance with the finger, *but no such examination is complete unless a speculum is passed* and the cervix well exposed in a good light. The patient may be either in the lithotomy or in the left lateral (Sims) position, for either allows good exposure. First inspect the vulva. Note any discharge and its nature and colour. Note whether there is any new growth on or about the vulva, such as a urethral caruncle, which occasionally gives rise to slight hæmorrhage. It should be remembered that a caruncle causes dysuria only in a small percentage of cases and the patient may therefore be unaware of its presence. Having excluded any vulval cause for the hæmorrhage, pass the forefinger (one finger is best and sufficient) into the vagina and feel for an ulcer or growth on its walls (a primary cancer of the vagina is very rare). Next pass the finger up to the cervix. If there is advanced cancer the diagnosis is usually easy—a fungating friable mass which bleeds freely on touching and occupies the vaginal vault, or the cervical canal may be widened into a crater-like cavity. Here stress is being laid solely on the diagnosis of the *early* case. After locating the cervix and the external os, note whether or not the cervix immediately around it feels " velvety." This feeling is characteristic of an " erosion " and nothing more may be felt in early cancer. Note, too, whether or not there is a bilateral or stellate tear in the cervix. Both these conditions predispose to cancer and therefore are often found in association with early cases. Note whether there is a small mucous polypus (usually about the size of a raspberry and stalked) projecting from the external os. It can usually be easily detected and moved about by the finger, but may be missed till the speculum is introduced. This polypus has nothing to do with cancer but sometimes gives rise to slight irregular bleeding. The polyp is easily removed by simply snipping it off, but it should never lead to a premature completion of the examination, for the polypus may be a " red herring " and cancer of the cervix may be present at the same time. Note next whether the cervix is enlarged as it may be by a radially spreading endo-cervical cancer. Finally, it is just as well to do a bimanual examination, noting any enlargement of the uterus, its mobility (it is neither fixed nor enlarged in early cancer) and the state of the appendages (certain inflammatory conditions in the tube and some rare new growths of the tube or ovary may cause irregular bleeding).

This completes the digital examination. On withdrawing the finger note whether or not it is blood-stained. A cervical erosion does not bleed on touching. If the finger is blood-stained it is an additional reason therefore for suspecting cancer.

The speculum examination.—The findings "*per speculum*" may confirm those of the digital examination. Thus there may be seen a stellate or unilateral or bilateral tear with or without eversion of the lips of the cervix (ectropion). There may be an erosion on both lips, appearing as a bright red area with poorly-defined margins, i.e. shading off into the surrounding paler mucous membrane, and sometimes with a papillary surface.

The probe test.—To determine whether this area is cancerous or not take a probe (a uterine sound will do) and try to push it into the suspected part. An erosion is tough, whereas a well-established cancer is friable, so that the probe can be pushed easily into it as into cheese, and the part so pressed on bleeds. Examine the cervical canal in the same way, testing it carefully in its whole length. This test is useful in recognizing fairly well-established cancers but *a really early cancer may not be friable and may not bleed.* In other words a negative probe test does not exclude cancer.

Schiller's test.—This test depends on the fact that cancer cells do not contain any glycogen and therefore do not stain with iodine while normal cells do. A solution consisting of iodine 1 gm., potassium iodide 2 gm., water 300 c.cm. is painted on the cervix. If any part remains unstained it is regarded with suspicion, and a small portion is removed there and then with a sharp spoon for microscopic examination. Schiller applies the test to every woman whom he has occasion to examine. Of every 100 thus routinely examined he finds that 30 give a sufficiently positive reaction to have a piece removed and examined. One of the 30 on an average eventually turns out to be cancer. Schiller believes that there is a pre-invasive stage in the growth of cancer, in which the cells still in their normal position in the surface epithelium take on cancerous changes, and that this early pre-invasive stage can be demonstrated by his test. He believes, quite rightly, that short of any dramatic advance in treatment the only hope of diminishing the high mortality from cancer of the cervix lies in early diagnosis—at a stage when the deeper tissues of the cervix are not yet invaded by the growth, and when therefore friability, ulceration, bleeding or any of the other easily recognized evidences of the disease are absent. He has many enthusiastic followers who, like him, apply the test to every cervix examined. The main difficulty with it has been, first, that it cannot be applied to the cervical canal, and secondly that it hardly helps in diagnosis of a cancer arising in an erosion, for an " eroded " area is of a bright red colour and it is therefore difficult to differentiate the parts that stain from those that do not.

Examination under anæsthesia.—As stated above, if the history or examination, including the probe test, reveal anything at all suspicious the patient should be admitted for examination under anæsthesia. This will usually resolve itself into removal of a piece from the most suspicious area for microscopical examination. This is the final and conclusive test. Again it should not be forgotten that the disease may be in the cervical canal and this should always be carefully curetted and any piece so removed submitted to examination. There need be no fear that a biopsy will spread the cancer; much more harm is likely to result from overlooking an early malignant focus.

Diagnostic curettage.—If the examination of the cervix proves negative further investigations are necessary, for the irregular bleeding of which the patient complained is still unexplained. It should never be forgotten that the disease may be in the body of the uterus. This can only be revealed by dilating the cervix and curetting the uterus, and this should be done in every case when the cervix is above suspicion. Opportunity can be taken when the patient is under the anæsthetic to palpate the appendages thoroughly in order to exclude any of those rare conditions in tube or ovary that may cause intermenstrual or post-menstrual hæmorrhage.

Differential diagnosis.—There are few conditions that can be mistaken for early cancer of the cervix, provided the cervix is properly examined by finger and speculum. A *cervical erosion* and *mucous polyp* have already been mentioned. Two other conditions are a *tuberculous ulcer*, which is rare and usually requires the microscope for certain diagnosis; and a *syphilitic ulcer*, which is also rare and is accompanied or followed by other signs of syphilis.

Cancer of the cervical stump.—Many cases have now been reported of cancer occurring in the stump of the cervix left after subtotal hysterectomy, and in consequence many operators, following Herbert R. Spencer, who first drew attention to the condition, never leave the cervix in performing hysterectomy. As a rule the prognosis is good in stump cancer because the patient knows that her uterus has been removed, and that continued or renewed bleeding is therefore abnormal, and so she presents herself for treatment comparatively early. The risk of cancer of the stump can be minimized (*a*) if total hysterectomy is always carried out instead of the subtotal operation when the cervix is lacerated or eroded (this means practically all parous women), and (*b*) if before deciding on subtotal hysterectomy in preference to total, the tissues lining the cervical canal are carefully tested with a probe as described above. Many stump cancers are " left overs " in that they were present at the time that the subtotal hysterectomy was performed.

TREATMENT

On the whole the best results in cancer of the cervix are obtained by the use of radium followed by deep X-ray therapy. In this country radium is usually applied according to the technique worked out by Heyman of Stockholm. Three applications are given in the following dosage. At the first application 30 mgm. of element are placed in the uterus and 70 mgm. in a flat applicator in the vagina. This is left for 22 hours giving a dose of 2,200 mgm.-hours of radium element. This dose is repeated one week later provided there is no pyrexia. If there is pyrexia the second application is delayed till it has settled down. A third and similar dose is given three weeks later and is followed six weeks after by twelve to sixteen exposures to deep X-rays. In inserting the radium the vaginal applicator is placed against the cervix and should be big enough to distend the vagina. It is important to protect the rectum by packing the posterior fornix with gauze so as to push the radium as far away from the applicator as possible. The general condition of the patient should also be attended to, and any curable condition, e.g. anæmia, treated.

Results.—Numerous statistics have now been published from clinics all over the world. Here the results can only be summarized, but the essential facts can be stated very briefly :

(*a*) In group I cases (i.e. those in which the growth is clinically confined to the cervix with a movable uterus and no palpable extension into the parametrium or elsewhere) the five-year cure rate is about 60 per cent. and the ten-year cure rate is about 40 per cent. These results may seem depressingly poor, but it must be remembered that in 25 per cent. of cases in which there is no *clinical* extension beyond the cervix there *is* extension if the tissues are microscopically examined. Even group I therefore contains a fair proportion of cases in which the cancer is fairly advanced. If the disease is in a really early stage, as in cases diagnosed by the Schiller test before the onset of symptoms, a much higher percentage of cures would be obtained, and Schiller claims almost 100 per cent. of cures in his cases so discovered.

(*b*) In group II cases (no *palpable* extension into the parametrium or elsewhere but the uterus somewhat fixed, indicating that there is some extension) the five-year cure rate is not more than 30 per cent. and the ten-year cure rate than 20 per cent.

(*c*) Of all cases of cancer of the cervix seen, early and late, there will be a total five-year salvage of about 20 per cent. and a ten-year salvage of about 6 per cent.

Radium versus operation.—How do these results compare with those obtainable by operation? The Wertheim operation is still practised by a few operators in early cases (i.e. groups I and II). In this country almost the only gynæcologist who advocates and practises the radical operation is Victor Bonney, who has published his results in a series of 384 cases. As his operability rate (viz. the percentage of all the cases seen on which he operated) is stated to be 63 per cent., the total number of his cases is presumably about 610. Even he, of course, operates only in groups I and II and treats his more advanced cases by radium. His results in groups I and II can therefore be compared with those obtained by radium in the same groups. Briefly, it may be said that the five-year cure rate taking groups I and II together is the same by both methods, viz. about 40 per cent., and the ten-year cure rate about 20 per cent. While, however, radium is attended by practically no primary mortality (patients dying at the time of or shortly after the operation and as a result of it) that of the Wertheim operation varies from 10 to 20 per cent. This is the great objection to the operative method of treatment. Besides, although the radical operation has already reached, at least in Bonney's hands, the highest perfection of which it is capable, the use of radium is comparatively recent and there is every reason to believe that the improvements in technique which may be confidently anticipated in the near future will give correspondingly better end results.

Histological types of growth in relation to curability.—There is as yet little agreement in regard to this. It is generally believed, however, that the more mature the cellular structure of the growth is, the less susceptible is it to radium. Thus a squamous epithelioma of mature type, i.e. with a well-marked tendency to formation of cell nests is believed to be less susceptible than the more immature anaplastic type. If this is true, it is fortunate that squamous epitheliomas in the cervix are usually very anaplastic, with little tendency to cell-nest formation and in that respect they differ very materially from squamous epitheliomas of the vulva.

How can patients be treated earlier?—Of 955 cases of cancer of the cervix seen by Schmitz only 10 per cent. belonged to group I. It has been seen that even in this group the five-year cure rate is only 60 per cent. and that this is because in a large proportion there is microscopical extension into the parametrium, which is not clinically evident. The problem is how to get cases in the earliest stage, when there is as yet no such extension. If patients could be treated in this stage there is no reason why with radium or even simple total hysterectomy, there might not be a cure rate of 100 per cent. It has been seen that there are no early symptoms of cancer of the cervix and that by the time bleeding, which is usually the first symptom, appears, the disease is always far advanced. Obviously, therefore, the only solution is routine examination at regular intervals, such as every six months after the age of 40, just as nowadays women visit the dentist every six months to have their teeth inspected. Until that comes about, which will probably not be until routine examinations become a habit of the whole population, male and female, much can be done in the way of prophylaxis.

Prevention of cancer of the cervix.—If it is true that injury and infection of the cervix are important predisposing causes of cancer, it is obvious that much can be done to prevent cancer by preventing these conditions in the cervix and in curing them when they have developed. An erosion usually arises because the cervix was torn in child-birth. Through the torn surface infecting organisms enter, set up inflammation (cervicitis) which in a short time produces the changes and appearances characteristic of an erosion. It might therefore be said with a near approach to truth " no tear, no erosion; no erosion, no cancer." The obstetric art has not yet progressed sufficiently far to prevent tears of the cervix even in natural child-birth, but they can be repaired immediately they have occurred. This is done in some clinics, especially in the United States. After the placenta is born the cervix is examined per speculum; if there is a tear of more than half an inch long it is immediately repaired. This is not yet routine in British clinics, but it probably should be.

The post-natal clinic offers another opportunity for preventive work. Six weeks after labour the cervix should be exposed as part of the routine examination. If it is found to be eroded, as it is in 90 per cent. of cases, the eroded area should be cauterized by the electric cautery. Usually three radial incisions about ¼ inch deep are made on each lip with the cautery loop, starting at the internal os and bringing the loop down the canal and outwards over the eroded area. The patient should be seen again in six weeks, when the erosion is usually healed, but some areas may require a light reapplication. In severe cases, especially when in addition to the erosion the cervix is badly split and the lips everted (ectropion with erosion), it is often best to admit the patient for a plastic repair. This should not usually be done until four to six months after delivery and it is often best unless the condition is very bad, to postpone the repair till the child-bearing period is over. Since the introduction of cautery treatment, however, the number of cases requiring a plastic operation is small. Even those in which there is severe ectropion can usually be cured by the cautery alone. In the gynæcological clinic, too, every erosion should be similarly treated.

It seems that it is along these lines (*a*) prophylaxis and cure of cervical erosion and ectropion and (*b*) routine examination of women, that the attack on the high mortality from cancer of the uterus can be most hopefully conducted.

CANCER OF THE BODY OF THE UTERUS

This constitutes about 10 per cent. of all uterine cancers. About 50 per cent. occur in nulliparæ and the age incidence differs from that of cancer of the cervix in that it is commonest from 50 to 70 but is extremely rare below 40. It is therefore usually a post-menopausal disease.

Pathological considerations.—The growth is almost always an adeno-cancer. Rarely it is a squamous epithelioma, preceded by a squamous-celled metaplasia of the columnar epithelium that normally lines the body of the uterus. The exact type of adeno-cancer varies. It may be a " malignant adenoma," in which the gland spaces are well formed—the least malignant type; or it may be an anaplastic and malignant growth in which there is comparatively little attempt at gland formation : 25 per cent. of cancer of the body are associated with uterine fibroids.

Diagnosis.—As in cancer of the cervix, there is no early sign.

The earliest is usually bleeding which is due to ulceration of the growth. As the growth is in the interior of the uterus it is protected from injury and infection and hence ulceration and bleeding are comparatively late. The bleeding may be slight, but, occurring between periods or after the menopause, it is always abnormal and calls for immediate investigation. This involves the same careful systematic examination of the history and of the genital tract as described under cancer of the cervix—by sight, finger and speculum, in order to exclude other causes of bleeding, such as cancer of the cervix. If this examination is negative a bimanual examination of the uterus is made. In cancer of the body it may be enlarged, especially if it contains fibroids. It may, however, feel quite small, for (*a*) a cancerous growth in the interior of the uterus rarely causes any appreciable enlargement except in an advanced stage or when there is associated pyometra and (*b*) the disease so often occurs in old women whose genital organs, including the uterus, have undergone physiological atrophy. If no other cause can be found to account for the bleeding therefore, and although the uterus does not seem enlarged, the cervix must be dilated and the uterus curetted, taking care to miss no part of its interior, for the growth may be very small and localized and easily missed with the curette. No matter how small the quantity of scrapings obtained or how free from suspicion they appear, they should be microscopically examined.

Differential diagnosis.—Other well-known causes of post-menopausal bleeding are (*a*) a mucous polypus of the cervix (see p. 14) and (*b*) senile endometritis with or without pyometra. Ninety per cent. of all post-menopausal bleedings, however, are due to cancer and it cannot be too strongly emphasized that such bleeding always calls for full and immediate investigation which generally involves diagnostic curettage. That the microscope alone can decide.

Treatment.—It is generally agreed that the best treatment of cancer of the body is total hysterectomy preceded by radium inside the uterus and followed by deep X-rays. The operation should be carried out three to six weeks after the radium is removed. Radium alone is less effective because (*a*) the cancer in the body of the uterus is not, except in the small highly anaplastic group (10 per cent.), radium sensitive; and (*b*) it is impossible always to place it in accurate apposition to the growth. This difficulty is accentuated if there are fibroids which distort the cavity. Radium and deep X-rays may, however, be used alone if operation is contra-indicated for any reason, such as cardiovascular disease, or if the disease has extended beyond the uterus into the parametrium, and in such cases there is a fair prospect of cure. The prognosis in cancer of the body is much more favourable than in cancer of the cervix for it is usually confined to the uterus until a comparatively late stage. With this combined treatment by radium and operation the outlook is, except in the most advanced cases, extremely good.

SUMMARY

(1) Intermenstrual or post-menopausal bleeding is always abnormal and always calls for immediate investigation.

(2) The diagnosis of cancer of the cervix may in early cases be difficult. A speculum should always be passed and the cervix inspected. The probe test is useful and the cervical canal should always be carefully explored. A negative probe test does not necessarily exclude cancer. If there is the least doubt a piece should be removed for microscopic examination. The value of Schiller's iodine test is discussed.

(3) The incidence of cancer of the cervix could be much diminished by the prevention and cure of infected tears and erosions. The value of examination of women at regular intervals after the age of 40 is stressed.

(4) On the whole the best results in cancer of the cervix are obtained by radium and X-rays.

(5) The treatment of choice in cancer of the body is radium followed by total hysterectomy and X-rays.

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SOME GYNÆCOLOGICAL SEQUELÆ OF NATURAL DELIVERY

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It is, perhaps, the experience of most general practitioners that although a woman may be delivered naturally without obstetrical complications she may subsequently suffer from a number of minor gynæcological complaints which restrict her activities. It is proposed to discuss here the principal disturbances of health from the point of view of the dominant symptomatology.

CONTINUOUS HÆMORRHAGE

Continuous uterine bleeding following upon natural delivery is a common occurrence, and in the average case the practitioner is at a loss to explain why the bleeding occurs. He knows that the placenta and membranes have come away intact and that there has been no evidence of sepsis. A moderate amount of uterine bleeding often develops when the patient gets up for the first time after delivery, but this usually stops within a few days. The more important form usually starts at about the end of the second week and may persist for many weeks after delivery, the patient being inconvenienced both physically and psychologically by the continuous loss of blood. The total amount of blood lost may not be particularly severe, although it is a contributory factor in the development of puerperal anæmia.

The etiology of this form of continuous uterine bleeding is gradually being elucidated. In the type of bleeding now under consideration there is no relation to uterine infection or to misplacement. It is well known clinically that cases are seen most frequently when lactation is discontinued for some reason or other, and particularly when lactation is deficient. Another clinical group includes the cases arising after primary inertia. It seems to be definitely established that after prolonged labours resulting from uterine inertia, patients show a well-marked tendency to suffer from continuous uterine bleeding arising after the first fourteen days of the puerperium. The cases should be regarded as being caused by defective involution of the decidua and endometrium of the uterus. At other times the bleeding is due to a condition exactly comparable to metropathia hæmorrhagica, when the endometrium shows all the characteristic appearances of this disease. Incidentally, persistent uterine bleeding of this type is not uncommon after miscarriage, and the same two pathological forms can be recognized, although with abortion cases it is common to find relics of chorionic villi attached to the thrombi which are dislodged from the uterus.

From the practitioner's point of view the most important consideration is the method of controlling the bleeding. First, he should remember that the bleeding will stop spontaneously in due course. On the other hand, he is unable to prophesy when this will be, and the average patient disapproves of expectancy. The usual course is to advise the patient to lie up as much as possible and to administer the liquid extract of ergot combined with some preparation of iron. Most practitioners know from experience that the treatment is not very satisfactory and that the bleeding may persist in spite of it. On theoretical grounds the administration either of mammary extract or of the corpus luteum hormone progestin would be advisable. I have had no success from the administration of mammary extract nor am I satisfied that a physiologically active mammary extract has ever been marketed. On the other hand, several practitioners of my acquaintance have insisted that they have obtained excellent results from the administration of mammary extract. So far as progestin is concerned, the results of its administration are good. But the treatment is expensive, probably beyond the means of the average patient. Dosages of the order of five units three times a week are necessary.

The average practitioner who seeks other advice for patients with this complaint wants to know whether or not the uterus should be curetted. In the first place, the results of curetting are excellent and almost always the hæmorrhage stops immediately. The objections to curetting are, first, that the operation may necessitate the patient being separated from her infant unless the operation is performed in the patient's own home, and secondly the risk of infection. It is true that this risk is almost negligible after normal delivery, but I have known two cases in which a fatal septicæmia has been lighted up after the treatment had been carried out for persistent bleeding following an abortion.

POLYMENORRHŒA

Polymenorrhœa is one of the commonest of gynæcological complaints, and about 15 per cent. of hospital gynæcological out-patients suffer from this condition. In a large proportion the symptoms follow upon child-birth and comprise the group of cases referred to as post-partum polymenorrhœa. Here, again, the etiology is probably related to endocrinal disturbance and it is fashionable to regard the condition as being caused by a persistence of the increased function of the anterior lobe of the pituitary gland, so that ovulation occurs more frequently than normal. So far as I know, however, there is no direct evidence in support of this hypothesis. The usual history given by the patient is that the menstrual periods occur more frequently than normal, persist for a longer time, and the amount of blood lost is increased. It is only rarely that a severe secondary anæmia is produced by post-partum polymenorrhœa. The main complaint is the inconvenience of frequent and profuse menstruation. The symptom may persist for several years after child-birth but in due course a normal rhythm is re-established. There is no evidence that post-partum polymenorrhœa is influenced by lactation and, as all practitioners know, the frequency of the periods is not controlled by the administration of ergot and iron. On the other hand, the amount of blood lost is reduced if the patient stays in bed and takes ergot by mouth. At the present day the treatment of post-partum polymenorrhœa is most unsatisfactory. The condition rarely responds to curetting and on theoretical grounds there is no reason why it should. Many methods of treatment have been employed. In some cases there is good response to the administration of large doses of progestin but the condition is apt to recur when the treatment is discontinued. I am not in favour of the use of small doses of X-rays or of radium, partly because the results are unreliable and also because the risk that a child born of a subsequent pregnancy will be malformed. Again, even if the patient embarks upon another pregnancy the condition almost always recurs during the next puerperium. Mammary extracts are advised by some authorities. Others maintain that when the symptom develops in association with a retroflexed uterus, the polymenorrhœa resolves after the uterus has been replaced, if necessary by ventri-suspension. If polymenorrhœa and retroflexion are found associated, however, the two conditions are coincident. The condition tends to clear up if the patient's general health is improved. Fatigue must be avoided and if possible the patient should be encouraged to lie up during one or two periods. Attention should be paid to nutrition and large doses of iron should be given daily for at least a month. Alcohol is definitely contra-indicated.

VAGINAL DISCHARGE

Vaginal discharge is an extremely common symptom after normal delivery, and most practitioners must at some time or other have had difficulty in explaining why the discharge develops. Cases of infection illustrated by discharges followed upon puerperal sepsis and by gonorrhœa are not under consideration in this article. There are two common forms of vaginal discharge which arise after natural delivery. The first is a vaginal leucorrhœa caused by a mild degree of vaginitis. The second results from the development of a glandular erosion of the cervix.

The vaginal leucorrhœic form.—In this type of case the discharge is thin and yellowish associated with soreness of the vulva and perhaps with pruritus. The vaginal walls are reddened and inflamed, and the discharge can be seen, after the passage of a speculum, in the posterior fornix and in the folds of the vagina. In severe cases, when the *Trichomonas vaginalis* can be detected in the discharge, the discharge is yellowish and much more profuse. Vaginal leucorrhœa of this type occurring post-partum is extremely common. The worst cases are seen when the vaginal orifice is patulous as the result of a perineal tear and there is some degree of prolapse of the vaginal walls. It has been suggested that the patulous vaginal orifice allows extraneous microbes to attack the vaginal walls and produce a low-grade vaginitis. On the other hand, the condition arises from time to time after Cæsarian section so that there must be some other factor at work. Hormonal influences have been invoked to explain the leucorrhœa and it has been suggested that there is an œstrin deficiency which renders the vaginal epithelium more disposed to transudation and less resistant to infection. It must be emphasized, however, that this type of case should be recognized by the general practitioner and he should look-out for it. When vaginal discharge is complained of during the puerperium. The condition is easily detected if the vagina is examined with a speculum in a good light. The treatment is simple. The patient should be given vaginal douches of lactic acid (60 minims to a pint of warm water) and the douche should be run in slowly. Devegan tablets should be introduced into the vagina, preferably one tablet after the evening douche and in severe cases one tablet night and morning. Again, it is important to insist upon attention being paid to the patient's general health. I always treat these cases with œstrin as I am convinced that a much more rapid improvement is obtained in this way.

Glandular erosion of the cervix.—There is another group of patients with vaginal discharge arising after child-birth in whom the pathology is quite different. In these cases the discharge emanates from a glandular erosion of the cervix and a profuse secretion of clear mucus from the cervical canal can be seen if the cervix is inspected. These cases have nothing whatsoever to do with infection of the cervical canal. The discharge is not purulent and on clinical grounds alone an infection of the cervix can often be excluded. The condition can easily be detected by inspection of the cervix and is distinguished from infective cervicitis because the discharge consists of clear mucus and the erosion is papillary and glandular in type. The etiology of the condition is unknown, but there is reason to believe that an increased circulation of œstrin is the predisposing cause, so that there is an undue proliferation of the mucous membrane both of the body of the uterus and the cervical canal.

Most practitioners are acquainted with this type of puerperal vaginal discharge and are usually disappointed with the results of treatment with antiseptics, caustics, electrotherapy, and diathermy. There is, however, no theoretical reason why any of these methods of treatment should be of service. The condition always clears up spontaneously in due course although again, many months may elapse before the condition of the vaginal portion of the cervix returns to normal. In the meantime, the mucous discharge can be irrigated away with an alkaline douche. Attention should be paid to the general health for this type of discharge seems to develop particularly in patients who are anæmic and asthenic. Promising results have followed from the use of the progestin hormone, although because of the expense of the method of treatment only a few patients have been treated.

RETROFLEXION OF THE UTERUS

Puerperal retroflexion is a common complication of childbirth. Three types should be recognized. In the first the retroflexion is congenital and if by any chance the patient was examined prior to pregnancy the retroflexion would have been recognized. The second type of case, the commonest of the three, results from weakness and laxity of the abdominal and pelvic musculature. In the third type the uterus is in a position of fixed retroflexion from adhesions caused by sepsis. This type is not dealt with in this article.

In the first place it is a mistake to assume that a patient always has symptoms because the uterus is retroflexed. Conversely, it is wrong to conclude that any backache the patient may have during the puerperium is necessarily caused by the retroflexion. All patients should be examined between the fourth and sixth weeks of the puerperium to determine *whether the uterus has become retroflexed. The replacement* of the uterus is usually simple and after its correction a Hodge pessary should be introduced to retain the uterus in its normal position of anteflexion. If backache is relieved by this manipulation it is reasonable to assume that the retroflexion is the cause of the backache. Clinical experience shows, however, that most cases of backache in the puerperium are not caused by retroflexion. At the present day puerperal retroflexion, apart from the congenital cases, should be regarded as the result of bad treatment. The condition arises because of laxity of the abdominal and pelvic musculature and is a manifestation of puerperal asthenia. It is the practice of the present day to insist upon patients employing abdominal exercises during the puerperium. From the third day of the puerperium the patient should exercise her abdominal and pelvic muscles by exercises and from the fifth day of the puerperium she should spend twenty minutes each day on such exercises. It is found in practice that if patients employ these exercises strenuously during the puerperium, a retroflexion caused by the laxity of the structures of the pelvis is unusual. On the other hand, in cases of congenital retroflexion, whatever exercises the patient undertakes, the uterus will become retroflexed. In this condition, however, the patient has no symptoms, and no treatment is necessary. Congenital retroflexion should be recognized by the acute flexion of the body of the uterus and by the firmness of the musculature of the uterus.

PUERPERAL PROLAPSE

Some degree of prolapse of the vaginal walls and even of the cervix may develop in women after natural delivery even although the child may have been of normal size and even in the absence of laceration either of the posterior vaginal wall or of the perineal body. In such cases the prolapse cannot be attributed to injury to the pelvic musculature or to stretching of the paravaginal tissues. The prolapse is caused by laxity of the pelvic musculature and ligaments. When the patients are examined it will usually be found that the vaginal orifice is relaxed and that both vaginal walls prolapse *on straining. Usually there is some degree of vaginitis with* a leucorrhœal discharge. The etiology of this condition should be attributed to puerperal asthenia and it is doubtful if it ever develops in patients who have been subjected to a course of exercises during the lying-in period. In some quarters at the present day there is much criticism of the modern practice of keeping patients in bed for the usual twelve days after a delivery. It is pointed out that in primitive races women do not lie up at all and that the result of lying in bed is for the mother to develop laxity of her muscles which leads to asthenia, retroflexion and prolapse. Certainly in some clinics on the Continent and, I believe, in some colonial hospitals, patients are made to get up after delivery as early as the third day, although they are confined to their rooms and otherwise nursed in the usual way. I keep my patients in bed for twelve days—not longer after natural delivery—but I insist upon fairly strenuous exercises being taken while the patient is in bed. Much depends, however, upon the subsequent behaviour of the patient. If she becomes over-fatigued and anæmic, she may yet develop prolapse because of puerperal asthenia. It must be insisted again how carefully the practitioner should supervise the activities of his patient for at least six months after delivery. He, more than anyone else, can decide how much rest and how much exercise his patient requires.

If, however, prolapse has developed, the position is rather different. Rarely in late cases a severe cystocele may have advanced to such a degree that it can be cured only by operative treatment. Such cases are most exceptional. In the average case of prolapse arising after natural delivery treatment should consist in the use of astringent douches of alum combined with a course of exercises and massage supervised by a masseuse. A masseuse should take control of the patient because it is important that the exercises should be carried out under supervision. In most cases these two procedures are all that is necessary—apart from the usual measures directed towards improving the patient's general health. In more severe cases a ring pessary should be introduced as a temporary measure to relieve the patient's discomfort. The *object of the pessary is not to cure the prolapse. It is only to relieve the patient's symptoms until the muscle tone is regained.*

PUERPERAL BACKACHE

There are numerous causes of backache developing during the puerperium. Backache caused by referred pain from inflamed appendages, from pelvic adhesions, and from the results of puerperal sepsis is not under consideration in this article. There are, however, many other cases. In the first place, a large number of cases are indirectly determined by change in posture. In the latter part of pregnancy the gravid uterus causes lordosis of the spine and during the puerperium the normal posture is reassumed. Some cases of backache result from imperfect muscle control, again caused by muscle weakness. Similar symptoms are encountered from time to time after the removal of large ovarian cysts and large myomas, but the puerperal cases are more severe, perhaps because even in the case of the vertebral column some laxity of the joints is normal to pregnancy. The backache is usually in the lumbar region and the obvious treatment is massage and graduated exercises. In other cases the backache is localized to one or other sacro-iliac joint when the usual history is obtained that the pain is referred down the buttock and thigh and the tenderness is localized to the joint itself. These cases are usually recognized without difficulty, and treatment consists in massage and exercises, but some support is always necessary and the best method is to use a broad elastic corset placed around the pelvis. In other cases the backache is caused by retroflexion of the uterus. In the investigation of such cases the modern treatment is to replace the uterus, retain it in position with a Hodge pessary, and then to determine whether the backache improves. If the backache persists it is clearly not due to the retroflexion. If, on the other hand, the backache is cured as the result of the replacement of the uterus, the cause is obviously discovered. Whether or not the patient is to be condemned to the use of a Hodge pessary or if she should be treated by ventri-suspension is beyond the scope of this article.

LEUCORRHŒA AND VAGINAL DISCHARGE

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In this article an account is given of some facts which help the gynæcologist and general practitioner in their investigation and treatment of patients complaining of certain types of vaginal discharge. This complaint is taken to include both an excess of a discharge the physical, chemical and bacteriological characteristics of which are within the limits of normal, and one which is pathological in nature. The management of a case in which the discharge from the vagina is blood, urine or fæces is not included. It is assumed that the discharge is sufficiently in excess of the normal to require the wearing of a diaper. It may be serous, mucous, purulent or hæmorrhagic. It may be irritating, coloured or colourless and offensive or non-offensive in odour.

The difficulty in treating patients with such discharges lies in judging the nature of the disturbance producing the complaint. In many cases a thorough examination discloses the cause of the discharge, and in such cases the chances of effective treatment are great. In many others in spite of careful investigation the cause of the discharge is not found, and it is not surprising that the results of treatment in such cases are unsatisfactory. In recent years the number of cases in which this complaint can be cured has increased because of a fuller knowledge and appreciation of the following facts concerning the normal vaginal discharge.

THE NORMAL VAGINAL SECRETION

The vaginal secretion and histological characteristics of the vaginal mucous membrane vary at different ages and are controlled by the activities of the endocrine system. The following details about the vagina during the various epochs of life are of practical importance, as they help to explain *not only the nature of certain disturbances in vaginal discharge* but also how they should be treated.

It is convenient to consider (*a*) the nature of the discharge; (*b*) the flora present in the vagina; and (*c*) the histology of the mucous membrane of the vagina during each of the following phases of life: (1) During later intra-uterine and neo-natal life; (2) From infancy up to puberty; (3) From puberty to the menopause; (4) After the menopause.

(1) At birth a secretion is present in the vagina. It is creamy-white in colour, often plentiful in amount and acid in reaction. It is often sterile at birth but within a week it is usually invaded with Döderlein's bacillus. The mucous membrane of the fœtus from the seventh month of intra-uterine life is thick and composed of many-layered stratified squamous epithelium in the cells of which much glycogen can be demonstrated. After the first week of life notable changes occur just when it has been shown that œstrin ceases to be present in the male or female infant's urine. During the later months of pregnancy œstrin is produced in the mother by the Graafian follicle and by the placenta. It is present in considerable amount therefore in her blood, amniotic fluid, colostrum and urine. The fœtus is therefore richly supplied with œstrin but at birth its source of supply is cut off and the œstrin is gradually excreted. Two of the disturbances of the neo-natal period, namely engorgement of the breasts and the occurrence of a blood-stained vaginal discharge, are explained respectively by the stimulation by and sudden withdrawal of the œstrin in the infant's blood. Associated with the marked diminution of œstrin from the infant's blood, the vaginal epithelium and discharge gradually change to that seen in the second phase of life.

(2) During infancy and up to puberty the vaginal discharge is scanty in amount, contains epithelial debris and leucocytes, and is much less acid in reaction. Correlated with this rise in pH, the flora of the vagina consists of a number of micro-organisms, including in some cases Döderlein's bacillus. During this period of life the vaginal mucous membrane usually is thin, atrophic, and its cells do not contain

glycogen.

(3) At puberty and preceding the onset of menstruation a change again occurs in the acidity of the secretion, in the flora of the vagina, and in the amount of glycogen present in its epithelial cells. Associated with the presence in the blood of considerable amounts of œstrin during reproductive life, the discharge becomes abundant, presenting a whitish appearance like curdled milk and strongly acid in reaction. In this discharge Döderlein's bacillus is present in abundance or even in pure culture. In the normal virgin this type of discharge continues until the menopause. The occurrence of coitus or operative interference increases the likelihood of the vaginal flora being a mixed one. If a definite infection is present, Döderlein's bacilli tend to disappear from the vagina and correlated with this the reaction becomes more alkaline. During reproductive life the vaginal mucous membrane is again thick, many-layered, sometimes keratinized, and rich in glycogen. During the early months of pregnancy the vaginal flora may be mixed, containing few Döderlein's bacilli. In the later months, associated with the increased concentration of œstrin in the maternal blood, Döderlein's bacilli tend to reappear in preponderating numbers or even in pure culture. The cells of the thick, congested pregnant vaginal mucous membrane are rich in glycogen and the vaginal discharge correspondingly highly acid in reaction. The occurrence of coitus or other vaginal interference during pregnancy interferes with this alteration in the pH of the vaginal discharge which in turn determines the type of the flora in the vagina, as a high acidity is inimical to all organisms except those of the *Bacillus vaginalis* group.

(4) With the onset of the menopause vaginal changes again occur. The discharge reverts to the type found in childhood. It is scanty in amount, more fluid in consistency, less highly acid in reaction, and its flora is correspondingly increased in variety.

The establishment of a relationship between the production of œstrin by the ovary and the deposition of glycogen in the cells of the vaginal mucous membranes has opened up a valuable line of treatment in those non-pregnant patients in whom the vaginal flora is at fault. The presence of glycogen leads to the production of lactic acid in the vaginal discharge, and lactic acid is inimical to organisms other than Döderlein's bacilli. By increasing the production of glycogen by injecting either œstrin or one of the anterior pituitary hormones, which stimulates the ovary to produce œstrin, it is hoped that the vaginal flora can be restored to a normal condition. It is also justifiable to prescribe acid douches or other medicaments likely to increase the acidity of the vaginal content. This knowledge also prevents unwise local interference in a case in which the complaint of leucorrhœa is due to occurrence of an abnormal amount of a discharge, the characteristics of which are within the limits of normality.

THE NORMAL CERVICAL SECRETION

Only at puberty with full development of the uterus is the cervical secretion fully established. It has the appearance and tenacious consistence of white of egg and is alkaline in reaction, the pH being about 8·5. Only after puberty can an increase in its quantity lead to the complaint of leucorrhœa. This may occur, in the absence of any infection, from various causes not yet understood.

Thus leucorrhœa may be the symptom complained of in two types of patient : (i) those in whom no discoverable lesion is present in the genital tract to explain the symptom ; and (ii) those in whom examination reveals the cause of the symptom.

CLINICAL INVESTIGATION

The clinical investigation of leucorrhœa entails (i) inquiry into the history and habits of the patient ; (ii) inquiry concerning the husband's health, if she be married ; and (iii) a gynæcological examination after the patient has refrained from any form of douching for forty-eight hours and from passing urine for three hours or more. For this examination the patient should be in the dorsal position with the sheet placed across the knees which should be well abducted, and the feet comfortably supported. The first essential is to see the discharge and therefore the external genitalia and all orifices must be inspected and gently massaged to obtain specimens of the discharge.

When a specimen of the discharge has been obtained, its reaction to litmus paper should be tested or its pH determined, using a capillator (B.D.H.). Films should be prepared and fixed for staining and a fresh drop of the discharge should be examined. It is essential to determine whence it is coming from and in certain cases it is necessary to perform the tampon test to determine whether or not the abnormal discharge is coming from the uterus. To do this, the vagina should be thoroughly cleared of discharge and a tampon of cotton-wool should be placed against the cervix for twenty-four hours. After its withdrawal, the discharge opposite the external os is examined.

A bimanual examination is advisable in most cases except in children. In virgins, it should be of the abdomino-rectal type in the first instance.

Further information may be obtained in some cases by (i) examining the patient's blood by the complement-fixation test for gonorrhœa; (ii) testing the discharge for the presence of urea, when the presence of urine is suspected; and (iii) examining a catheter specimen of urine to find if in an infection of the vagina the same organism is causing any coexistent urethritis.

FURTHER CLASSIFICATION

This examination should render it possible to place most patients into one of the following categories :—

(1) Those suffering from an excess of discharge (*a*) from the vagina or (*b*) from the cervix, the physical, chemical and bacteriological characteristics of which are normal.

(2) Those suffering from gonorrhœa in the acute or chronic phase.

(3) Those suffering from non-gonorrhœal inflammatory lesions of the cervix, uterus and tubes and rarely from a pelvic abscess.

(4) Those suffering from non-gonorrhœal vaginitis.

(5) Those suffering from neoplasm of the genital organs.

TREATMENT

The foregoing groups can now be considered in regard to treatment.

(1) When the patient is suffering from an increase in the amount but not in the nature of the cervical secretion or vaginal discharge, no local treatment should be given except that of keeping the external genitals clean. General treatment, such as increasing the time spent in the open air, supervision of diet, administration of iron, thyroid gland, calcium, yeast, and vitamins A and D, as in radiostoleum, seems to help in some cases. The non-infective form of increased vaginal discharge is the type complained of by virgins. In some cases, evidence of endocrine dysfunction, such as obesity, mental dullness, dysmenorrhœa, oligomenorrhœa or relative amenorrhœa, is present. In others, psychological abnormality, anæmia, constipation or malnutrition may be present and improvement will follow the cure of these conditions. Sharman and Cruickshank found that X-ray examination of the sella turcica frequently revealed a shallow fossa and that the amount of œstrin in the urine was frequently in excess of the normal amount. In yet another group of cases, no other abnormality can be identified. The discharge is non-irritating, highly acid (the pH being 4·2 to 4·7), thick, creamy and contains only Döderlein's bacilli. Such discharge is often associated with glandular hyperplasia of the corporeal endometrium, a fact which favours the supposition that the leucorrhœa is a symptom of endocrine dysfunction related to œstrin excess in the blood. Investigation is therefore needed to ascertain the effect in these cases of the administration of prolan or antuitrin-S containing the controlling hormone of the anterior pituitary gland. It is difficult to judge the result of this treatment, as the discharge is known to clear up when least expected and then relapse again unexpectedly.

(2) If the complaint of vaginal discharge is found to be due to gonorrhœa in the acute stage, it is essential that (i) the patient have complete rest in bed, preferably for two weeks,

and (ii) free drainage of the vagina and uterus be maintained and therefore the uterus must be in good position. Sexual excitement or intercourse should be prohibited and also the taking of alcohol. The bowels should be opened daily with a saline purgative. Strong tea, coffee and highly-seasoned foods should be avoided. Usually the diet should be light and nourishing. A tumbler of bland fluid, water, barley water, lemonade, imperial drink, or milk should be taken preferably one hour before each meal. Sitz-baths lessen the irritating effect of the discharge on the labia and legs. The sitz-bath may contain one teaspoonful of sodium bicarbonate, dettol or milton to the pint, or may be coloured strongly pink with potassium permanganate. After the acute phase has subsided, low-pressure douches of three to four pints of saline or dettol at 105° to 108° F. may be given by a nurse and, if extension to the uterus and tubes has occurred, larger douches at 112° to 115° F. are helpful. The practitioner should cleanse out the urethra and cervix thoroughly with probes covered at the tip with cotton-wool soaked in a saturated solution of sodium bicarbonate. Then pure glycerin, glycerin and protargol or dettol may be applied to the cervix on a tampon or a loose pack of gauze in the vagina and left in position for less than twelve hours.

In chronic cases, in which pathological discharge is coming from the uterus, any erosion, Nabothian follicles or polypi of the cervix should be dealt with. The cervix should be dilated under an anæsthetic and 40 to 50 c.cm. of sterile glycerin should be run slowly into the cavity through a rubber catheter, No. 8. The catheter should be stitched in position with No. 2 catgut and the cavity of the body and cervix washed out daily with sterile glycerin until the catheter is expelled spontaneously. Heat should be applied by means of prolonged hot douching and, if the infection has spread to the tubes, suprapubic antiphlogistine, hot fomentations and the electric cradle should be applied. After puberty, when Skene's ducts and Bartholin's glands are fully developed, they are likely to become infected by the gonococcus. If a Bartholin's gland is acting as a reservoir for the gonococci, it should be removed. It should, however, be remembered that only about sixty per cent. of cases of Bartholinitis are gonococcal in origin.

Treatment should continue until the films and cultures contain no gonococci nor pus after three succeeding periods. The final examination should not be made until treatment has been stopped for three to four weeks. About thirty-six hours before this examination the urethra and cervix should be painted with 25 per cent. protargol. The blood complement-fixation test should also be negative before the patient is considered cured of gonorrhœa.

(3) The discharge complained of by patients suffering from inflammation of the tubes rarely, if ever, comes from the tubes. An intermittent sudden escape of serous fluid from a hydrosalpinx has been recorded. Except in cases of gonorrhœal endometritis, discharge from the corporeal endometrium is rarely of much clinical importance except when there is puerperal acute or subacute endometritis, or tuberculous endometritis. The cervical glands are the most frequent source of pathological discharge. The presence of an erosion or of laceration with some degree of eversion is usually associated with a mixed chronic infection and resulting hypersecretion. These conditions should be treated along the lines given for the treatment of gonorrhœa. Cauterization of the cervix in lines ½ to 1 cm. apart and radiating from the external os may need to be repeated after an interval of three to four weeks. Leucorrhœa will follow cauterization of the cervix and may last many weeks, ceasing when full contraction of the cicatricial tissue has occurred. Surgical repair of the cervix may be necessary or removal of part or the whole of the uterus. The rupture of a pelvic abscess into the vagina is rare and the establishment of free drainage and in some cases the instillation of sterile glycerin gives good results.

VAGINITIS

(4) When the gonococcus has been eradicated and the treatment of the chronic inflammation of the uterus has resulted in lessened secretion from the glands, treatment should be

directed to securing a satisfactory flora in the vagina. Vaginitis and its associated leucorrhœa may be due to the presence of (*a*) the protozoon *Trichomonas vaginalis;* (*b*) a fungus of the monilia group; or (*c*) one or many types of other micro-organism. In all cases the treatment is directed to (i) clearing away any irritating discharge; (ii) destroying the infecting organism; and (iii) producing an acid reaction in the contents of the vagina, which is inimical to all except the Döderlein's bacillus.

(*a*) *Trichomonas vaginalis infection of the vagina.*—In many of the cases of vaginitis the *Trichomonas vaginalis* is found microscopically in a fresh drop of the discharge. It is actively motile in untreated cases but, especially after some treatment, takes the form of a rounded cyst. When vaginitis is present, associated with it in the vagina are other organisms, particularly hæmolytic streptococci and colon bacilli. Symptoms continue until the trichomonads are exterminated from the vagina. The symptoms and signs of *Trichomonas vaginalis* vulvovaginitis are discharge and irritation of vulva and vagina with consequent pain, dyspareunia and dysuria. The discharge is thin, acrid, yellowish in colour, frothy and offensive, and becomes worse after menstruation. Its reaction to litmus is acid, its pH being 5·0 to 5·6. On the mucous membrane of the vestibule and labia minora tender dark red areas are present and there is a dark red mottling of the vagina and cervix. A method of treatment, which is successful, is to clean thoroughly the vagina and adjacent structures with tincture of green soap and water, instil hexyl-resorcinol over the vaginal walls and into the vault, then insert a tampon soaked in glycerin followed by a dry one. The latter has its string marked and the patient is instructed to pull this out first. The vulva is painted with hexyl-resorcinol. The tampons are pulled out after twenty-fours hours and a green soap douche is given. This should be repeated every second day for at least one week. When no trichomonas are found following menstruation, the green soap douche should be superseded by one of lactic acid (B.P.) one teaspoonful to the pint. The daily lactic acid douche should be continued for at least two weeks. Good results are also obtained by the use of devegan tablets (Bayer) after the parts have been thoroughly cleansed with green soap. Two tablets should be inserted daily high up in the vagina for at least one week and the patient should not douche or take sitz-baths. The use of devegan should be continued until trichomonas are no longer found and Döderlein's bacilli are present in satisfactory number in the vaginal flora.

(*b*) *Monilia infection of the vagina.*—Vaginitis due to a fungus of the monilia group occurs, and is characterized by the appearance of raised white patches with a surrounding zone of the hyperæmia typical of thrush. It is most frequently seen in those suffering from diabetes or during the later months of pregnancy. In a fresh drop of discharge mycelial threads and conidia are seen. The fungus grows best in a strongly acid medium and so the infection is worse just before menstruation and during the later months of pregnancy, when there is an excess of glycogen in the vaginal mucosa and an associated high lactic acid content of the vaginal discharge. The infection can occur, however, in children and in senile women. Monilia may be present in the vagina at the same time as trichomonads. The treatment is to paint the vulva and vagina with a one per cent. gentian violet solution in glycerin twice weekly. The patient should douche daily with sodium bicarbonate, one teaspoonful to the pint, in order temporarily to render the discharge more alkaline in its reaction to litmus.

(*c*) *Bacterial infection of the vagina.*—Diphtheritic vaginitis in children and a scarlatinal (streptococcal) form occur. Whatever the bacterial infection may be, an attempt should be made to change the flora by the use of acid douches, for example lactic acid douches, or acid medicaments, for example devegan tablets. If the patient is given œstrin by injection or an anterior pituitary preparation, which will stimulate the ovary to produce œstrin, the amount of glycogen in the mucosa will be increased with a consequent increase in the amount of lactic acid in the vaginal discharge.

DISCHARGES AND NEOPLASMS

(5) Leucorrhœa is also a complaint made by those suffering from neoplasm of the genital organs. In the early stages of

carcinoma, whether in the tube, which is rare, or in the body, cervix or vagina, a thin serous discharge may be noted. Sarcoma is also in its early stages associated with the presence of a similar discharge. It is probably a serous transudation from the newly-formed capillaries of the growing tumour. When necrosis and ulceration of the tumour sets in, bacterial invasion of the growth occurs and the discharge becomes offensive. The nearer it is to the vulva the sooner invasion of the tumour by saprophytic and pyogenic organisms occurs. Leucorrhœa may also be one of the symptoms which draw the practitioner's attention to the presence of an adenomatous condition of the endometrium with or without polypoidal formation, of a submucous sessile or pediculated fibromyoma of the body, cervix or vagina, or rarely of melanotic sarcoma of the vulva. Interference with the blood supply of any of these tumours results in bacterial invasion of the tumour and the production of purulent foul-smelling discharge. The treatment in all types of neoplasm is surgical and may or may not involve the use of radium or X-rays.

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THE PRACTITIONER

THE DISORDERS OF MENSTRUATION

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IT is most remarkable that menstruation remains normal when the numerous factors are considered which, collectively or individually, may disturb the normal cycle. The process of child-bearing, although a physiological interruption, produces astonishingly little disturbance, and the involved mechanism of menstruation appears to possess remarkable powers of self-adjustment. It is generally accepted that the normal menstrual cycle is of four-weekly occurrence and the actual bleeding lasting four or five days, moderate discomfort and malaise being usual with varying general and local symptoms. It is also recognized that individual and regular, slight variations may be present and, in such a case, are normal. The object of this communication is to deal with the various well-known menstrual disorders. They are discussed under separate headings, particular attention being drawn to a brief outline of the ovarian hormone treatment of certain varieties.

AMENORRHŒA

Absence of menses is referred to by the term amenorrhœa.

Physiological amenorrhœa.—Physiological absence of menses is expected until puberty, during pregnancy and lactation, and after the menopause. A very early onset of menstruation may occur before the age of ten years, but such precocity is uncommon in these countries, the usual onset being at about 14 or 16 years of age. At the other extreme, menses disappear between the age of 40 and 45 years, but exceptionally at a much earlier or later date. While amenorrhœa is the rule during pregnancy and lactation, exceptions occur without ill result to mother and child. It is difficult to determine whether regular, four-weekly bleeding during the first three months of pregnancy is a threatening abortion or true menstruation. Regular recurrence of such hæmorrhage during pregnancy favours the belief that ovulation continues after fertilization. Furthermore, it is known that superfœtation occurs, fusion of the decidua vera with the decidua reflexa not being complete until the end of the third month. In some cases, ovulation is certainly *re-established during lactation,* although amenorrhœa is usual. This explains the possibility of pregnancy during the amenorrhœa which usually accompanies breast feeding, and thus this time may not be regarded as " safe " from the contraceptive standpoint.

The three types of physiological amenorrhœa mentioned are directly due to ovarian influence. A premature menopause—say, at the age of 25 years—following a pregnancy is due to cessation of further ovulation and, whether permanent or temporary, will be associated with the usual menopausal syndrome.

Congenital amenorrhœa.—Congenital absence of the uterus, vagina, ovaries (rare), or an imperforate hymen all produce amenorrhœa. Similarly, underdevelopment of the ovaries leads to absence of menses and, owing to the absence of growth stimulus, secondary sex characteristics fail to appear. It is easy to recognize hæmatocolpos due to an imperforate hymen or to congenital atresia of the vagina, but the diagnosis of absence of the uterus is difficult. When the uterus is present blood will collect in the various potential cavities and periodic malaise will be noted. When the ovaries are either absent or markedly inactive no history of such disturbance can be obtained.

Acquired amenorrhœa.—Constitutional diseases, such as diabetes mellitus, chlorosis, leukæmia and pernicious anæmia, frequently cause amenorrhœa. If these causes are remembered, their diagnosis is a matter of routine and the patient's appearance will be a guide. It is well to recollect that amenorrhœa in a young woman is frequently due to phthisis, and that absence of menses following mumps is rare, but does occur, as the result of severe and bilateral oöphoritis. Occupational disorders are common and temporary suppression of menses is frequently associated with change of surroundings. This is most commonly seen when a girl accustomed to the country and an out-door life becomes resident in a city or town, and is occupied indoors. Fear of pregnancy, melancholia, and other nervous factors also prevent menstruation, and temporary cessation often follows a gynæcological operation. This last factor is so well known that the woman should be warned of the possibility before she leaves hospital. Finally, temporary alcoholic excess, chronic alcoholism, morphine and other drugs produce amenorrhœa due to depressing and poisonous effects. The results of either operative or irradiation castration are already well known; radium and X-rays destroy the activity of the cortical cells of the ovary.

Amenorrhœa of endocrine origin.—Hypothyroidism (e.g. cretinism) is a well-known cause of absence of menses and it is supposed that the lack of thyroid secretion removes one of the hormonal stimuli to the ovary. Relief of this deficiency, as for example in myxœdema, is quickly followed by restoration of normal function. Acromegaly is often coincident with amenorrhœa, as with all forms of pituitary dysfunction, e.g. tumours, from a deficiency in anterior lobe pituitary hormones (prolan A and B). Benign or malignant tumours of one or both ovaries may interfere with the follicle maturation and hormone production, thereby causing amenorrhœa. Irregular menstruation with absence of menses for two to six months is quite common at the menopause and during active sex-life. When general diseases can be excluded we must regard these as examples of endocrine origin.

MENORRHAGIA

Menorrhagia is the term applied to excessively heavy menstrual bleeding.

Local causes.—Any local overgrowth of endometrium, such as a mucous polypus, a retained portion of placenta, membrane or blood clot which has become covered by endometrium (placental polypus) and localized adenomyosis of the uterine wall, will cause hyperæmia and congestion thereby promoting excessive menstrual bleeding with clots. Malignant disease of the body of the uterus is always associated with similar disturbance but, in addition, the extreme vascularity and friability of the new growth usually give rise to irregular intermenstrual bleeding (metrorrhagia) with offensive uterine and vaginal discharge secondary to infection. Fibroids, generalized adenomyosis of the uterine muscle wall, inflammations (endometritis and salpingitis), excessive coitus, and constipation also cause uterine congestion and heavy bleeding. Similarly, misplacements of the uterus favour congestion of that organ; menstruation too soon after miscarriage or full-term delivery, or when chronic subinvolution and sepsis are present, will be excessive. Fibrosis uteri with large and fibrous-walled blood vessels permits heavy bleeding, timely hysterectomy being the best means of preventing marked secondary anæmia. Irregular hæmorrhage is rare with true fibrosis uteri and chronic uterine subinvolution.

General causes.—Acute fevers (pneumonia, influenza) and other acute general diseases often produce excessive menstrual loss. A similar complaint frequently accompanies the leukæmias.

Endocrine causes.—At puberty and the menopause abnormality may be expected from faulty ovulation with, it is supposed, lack of corpus luteum hormone (progestin). In Graves' disease and hypopituitarism amenorrhœa is the rule, but menorrhagia may occur from deranged hormone balance. A similar state of affairs exists with ovarian tumours, the persistent follicular ovarian cysts being quite common and also the cystic new growths, the cystadenomas.

METRORRHAGIA

The term metrorrhagia is applied to irregular uterine hæmorrhage occurring at a time other than the correct date according to the usual cycle. Recently the term epimenorrhœa has been suggested to differentiate the repeated bleedings due to too rapid ovulation from those arising from a definite pelvic pathological source. This has not been generally accepted, but would be of great practical value if the exact etiology of irregular hæmorrhages could be definitely established.

Local causes.—As in the case of menorrhagia, any localized abnormality of the endometrium is likely to produce bleeding at unusual times. Such conditions as an endometrial mucous polypus, a submucus fibroid, a placental polypus, carcinoma of the body of the uterus and cervical polypi are quite common. Chorionepithelioma, a carcinomatous degeneration of some portion of a placental villus, may develop following any pregnancy and its presence must be excluded by curettage whenever there is persistent, irregular bleeding during the puerperium. In early examples of such cases there will be persistent enlargement of the uterus (subinvolution); later there may be red, easily bleeding areas on the cervix and vaginal walls with secondary deposits in the lungs. Whenever doubt exists the Zondek-Aschheim test is of great value. Normally this reaction becomes rapidly weaker from the moment of delivery. When chorionepithelioma is present the test becomes more strongly positive, owing to fœtal remnants remaining in contact with the maternal blood and a great quantity of gonadotrophic (pituitary) hormones being present in the maternal system.

Irregular hæmorrhage may result from threatened abortion, hydatidiform mole pregnancy, threatened or actual rupture of the tube in the case of tubal pregnancy. Under these circumstances, the history will suggest pregnancy and bimanual examination will be necessary. The passage of small " white-current "-like cysts in a blood-stained vaginal discharge is diagnostic of hydatidiform degeneration, the uterus being of doughy consistence and larger than expected from the period of amenorrhœa. X-rays will reveal no evidence of a fœtus. A point which is frequently overlooked in the diagnosis of tubal pregnancy is that threatened rupture very frequently occurs *during the two weeks immediately following the first missed period.* When there is any doubt in such a case use the Zondek-Aschheim test and examine the patient under full anæsthesia. Abnormalities of the cervix uteri, such as erosion and polypi, may cause irregular hæmorrhage and are easily diagnosed. In all such cases exclude early carcinoma of the cervix, as permanent cure by either radium, operation, or both combined, is rare even when a small degree of spread has occurred. Coitional hæmorrhage in a menopausal case, combined with irregular bleedings and a brownish or fœtid vaginal discharge should always arouse suspicion of cervical cancer. The use of an aqueous solution of iodine (Lugol's) in such cases stains healthy, vaginal epithelium a dark mahogany brown owing to the high glycogen content of the epithelium. Cancer cells do not contain glycogen to the same degree, the area of new growth remaining pale, yellowish white in contrast to the surrounding normal mucosa. This test (Schiller's) is both rapidly and easily applied and, though not certain, indicates a suspicious area. A few cells scraped off the pale area and examined microscopically will afford exact information. Schiller's test deserves a more extensive trial.

Finally, it must be remembered that varicose veins of the vaginal wall, hæmorrhoids, and urethral caruncles may give rise to irregular bleedings simulating true metrorrhagia. These sources are readily recognized if the patient can be examined whilst the bleeding is in progress.

General causes.—Any pelvic inflammation (gonorrhœal, tuberculous) produces local hyperæmia thereby causing ovarian and endometrial congestion. In this way irregular bleeding may result from either local oozing or indirect stimulation of the uterine mucosa through ovarian over-activity. In the last-mentioned way, also, torsion of the pedicle of an ovarian cyst may produce uterine hæmorrhage. It may here be mentioned with advantage that tuberculous endometritis is not nearly so rare as is generally supposed. Appendicitis, with pelvic peritonitis and hyperæmia, will cause bleeding. Here the diagnosis from salpingitis is difficult but usually possible as the result of bimanual examination and careful analysis of the history, signs and symptoms.

Endocrine causes.—Ovarian hyperæmia deranges ovulation and thereby a more rapid succession of stimuli is applied to the endometrium. A similar derangement follows from excessive stimulation by anterior pituitary lobe hormones. The endometrium is unable to respond to this over stimulation, the result being imperfect function and consequent irregular bleedings. In inflammatory cases, apart from the endometrium being, as it were, " out of step," there is usually coincident inflammation of the endometrium itself (endometritis) which is *per se* a cause of bleeding. Menopausal and pubertial irregularities have been mentioned already as examples of disorders due to irregular ovulation. These hæmorrhages are, when hormonal in origin, associated with characteristic hyperplastic endometrial changes and are referred to as either juvenile or menopausal metropathia hæmorrhagica. In such cases the uterus is large and soft, but there is no definite evidence of either pregnancy or true inflammation. One or other ovary will be palpable bimanually and tender on examination due to cyst formation.

DYSMENORRHŒA

This term is applied to the painful menstruation and severe monthly disturbances which are so marked as to entail partial or complete invalidism necessitating rest from work or pleasure. The complaint is frequent in nulliparæ, being relatively uncommon in women who have borne children or miscarried after a period of pregnancy more than four months. The various symptomatic disturbances found in dysmenorrhœa are so well known that they need no mention here.

Dysmenorrhœa is very common and extremely difficult to cure. Some degree of relief may be promised, but it is most unwise to be too confident of the degree to which any treatment will succeed or the duration of its good effect. Avoid drugs and sedatives in such cases whenever possible, and remember that complete absence of discomfort at the menstrual period is very exceptional.

It is customary to describe dysmenorrhœa under certain headings (intrinsic, spasmodic, exfoliative or membranous), but in this communication the usual classification will be avoided and the subject considered from the etiological aspect.

Local causes.—When scanty menses and uterine under-development are present, dysmenorrhœa will be severe. Doubtless, the two conditions frequently co-exist and until recently the uterine condition, such as hypoplasia and acute anteflexion, was regarded as the chief cause of the pain. Nowadays such general under-development is regarded as an indication of ovarian hormone deficiency, and treatment aims at producing uterine development by prolonged follicular hormone therapy. This has resulted both from repeated failure to cure by operation and general treatment and from the present greater knowledge of the mechanism of menstruation. Uterine misplacements, most commonly acute anteflexion and retroversion, frequently accompany uterine hypoplasia. In such circumstances hormone therapy alone will rarely give complete relief, so that dilatation of the cervical canal combined, when necessary, with cure of the uterine misplacement will usually be required at a later date.

It is difficult to separate the ovarian factor from dysmenorrhœa. In some cases the chief menstrual, or premenstrual pain is ovarian tenderness. In such cases nausea and vomiting are marked. In some instances the ovarian tenderness is unilateral but more frequently it is bilateral, being more marked on one side than the other. Here pelvic adhesions, or prolapse of the ovary may be present with cystic changes, but no gross pathology may be evident. When there is an old-standing pelvic lesion, a damaged and thickened ovarian cortex will cause dysmenorrhœa and menstrual irregularity.

It has already been stated that a sharp distinction must be drawn between dysmenorrhœa in the nullipara and multipara. Painful menstruation is usual to some degree in the former, particularly when associated with sterility or dyspareunia but, as also has been pointed out, its occurrence to any severe degree is relatively rare when the patient has been delivered of a fœtus of more than four months development. This is difficult to explain and it is said to be due either to Nature's cure (dilatation of the cervical canal) or more ovarian hormone being available as a result of prolonged pelvic hyperæmia and anterior pituitary reaction. Possibly both factors co-exist. Whatever the explanation, dysmenorrhœa in a parous patient is rare without a pelvic abnormality, such as prolapse of one or both ovaries, pelvic adhesions and an uterine misplacement. Furthermore, cure of dysmenorrhœa in a multipara is comparatively easy and follows the restoration of normal, pelvic anatomy. Tumours, chiefly uterine fibroids, are frequently associated with dysmenorrhœa. As their removal is followed by relief it is reasonable to conclude they predispose towards pain but probably the cure following myomectomy is due to relief of local congestion.

General causes.—It is well known that severe anæmia and chlorosis contribute towards dysmenorrhœa. This is due to poor general health with, in all probability, depression of internal secretions. Similarly unhealthy surroundings, lack of exercise, fatigue, constipation and many other factors which could be grouped as " bad hygiene " predispose towards undue discomfort and favour introspection. Removal of such contributory factors leads to great improvement and, possibly, complete relief.

Endocrine causes.—Here again is a problem which is as yet incompletely answered. It is known that uterine hypoplasia is due to lack of follicular (œstrin or theelin) and anterior pituitary hormones, and that the ovarian hormone produces both active uterine contractions and activity of the uterine mucosa. Conversely, the corpus luteum hormone (progestin) exerts an inhibitory effect upon uterine muscle activity whilst it converts the regenerated uterine mucosa from the proliferated state into the premenstrual (progravid) type. From these data we attempt to formulate an endocrine therapy, being sometimes rewarded by striking success, though on other occasions meeting with either complete failure or even the shock of learning that discomfort has increased as a result of the treatment. There is, as yet, much ignorance as to the exact dosage and preparation to employ but, in all probability, the dosage is far too small and many of the preparations available are both impure and unstable. Failures will be encountered, but there is no doubt that they will become increasingly less frequent as our experience in such cases increases.

It is important to distinguish between true dysmenorrhœa and the so-called " mittelschmerz " of the German writers. This is painful ovulation, occurring ten to twelve days before the actual onset of the menstrual flow, and the pain (sudden and severe in type) is localized over one or both ovaries. Its presence usually denotes old-standing pelvic inflammation with a thickened ovarian cortex causing difficulty in rupture of a Graafian follicle. The peritoneal tension reaches a peak at the moment of rupture, being exaggerated in such cases and producing sudden pain. While found in virgins and nulliparæ this variety appears most frequently in the multipara suffering from chronic pelvic disease with adhesions.

OTHER DISORDERS

The foregoing remarks are but a very brief outline of the chief menstrual disorders. In a communication of this character, embracing such a large subject, many interesting points may be mentioned, but space does not permit their full discussion. The power of hormonal influence in producing menstrual derangement may appear to have been unduly emphasized, but the prominence given to this idea is deliberate in the hope that greater general interest may quickly solve the recently-established and poorly-known therapy. The small experience of one individual is of no great scientific value but may be of interest. It is on these grounds that a brief outline of the personal experience of ovarian hormone therapy in the treatment of such disorders is included. It should be noted that no anterior pituitary hormones are quoted here. This omission is deliberate, as the available material treated has been very small and it was felt that one reliable ovarian preparation should be given a full trial.

Pubertial hæmorrhage.—The results obtained in this disorder have been most encouraging. A preparation of corpus luteum hormone has been given to each case with but one failure, while in another instance very high dosage was required.

In this particular case—a girl of sixteen years of age—there had been continuous bleeding for seven months, which had not responded to small dosage of the same preparation. Curettings were typical of juvenile metropathia hæmorrhagica, but the operation did not control the bleeding. Five injections of the full strength corpus luteum hormone were then given and were followed by six weeks amenorrhœa. Menses again returned, being prolonged for 12–14 days, but bleeding ceased after two injections and have been normal in amount and rhythm for the past eight months.

No case of the juvenile type has, as yet, failed to respond to large, repeated dosage. In such cases bleeding always recurs forty-eight hours after it is first controlled, being on this occasion a true menstruation and thereafter a four to eight weeks' interval of amenorrhœa follows until the next period. In the instance in which treatment failed, a virgin of 28 years of age, bleeding failed to respond to large dosage. Operation revealed extensive, bilateral cystic degeneration of the ovaries. In all instances " proluton " (Schering) was the corpus luteum hormone employed.

Menopausal metropathia.—Here results are not nearly so uniform owing, it is suggested, to additional abnormalities, such as chronic endometritis and other injuries resulting from inflammation and child-birth. In most cases the bleeding can be controlled by repeated corpus luteum hormone treatment and, if no local abnormality is present, will be unlikely to recur. Failure may be expected when there are gross cystic changes in the ovaries, uterine fibroids, fibrosis uteri, and adenomyosis. Here more radical treatment has been necessary, hysterectomy giving the best results. Curettage is disappointing, affording but a temporary relief, the ovarian abnormality being still present.

Amenorrhœa.—Delayed puberty may be successfully treated by regular and prolonged substitution therapy employing the follicular ovarian hormone. For this purpose, the various preparations of Schering's " progynon " were used. Most cases responded within a short time, although the bleeding thus produced frequently was slight and amenorrhœa often recurred when treatment ceased. In such instances further treatment was carried out with greater follicular hormone dosage combined with premenstrual administration of proluton, the corpus luteum hormone. In this way, the complete therapy exactly resembled the normal cycle. When resulting menstruation was normal for three to six months the treatment was gradually stopped, thus avoiding too sudden change and recurrence of amenorrhœa. In spite of this precaution further periods of amenorrhœa were noted, necessitating further treatment.

In most examples of menopausal amenorrhœa, which were usually associated with nervousness, irritation of the vulva, flushings and other climacteric disturbances, there was a rapid response to ovarian follicular hormone therapy. Relief of the general symptoms was the chief consideration (menstrual irregularities being regarded as relatively unimportant) and extremely good results were obtained.

It is interesting to note here that if the menses do not return after four to six months intensive hormone therapy, the failure is said to be due to decreased activity of the anterior pituitary lobe. When substitution therapy ceases, a greater quantity of anterior lobe hormones are probably produced, thus supplying the necessary impetus to the ovarian cortex and ovulation is spontaneously established.

Other types of amenorrhœa occur between the two already mentioned. Cessation of menstruation, no cause such as anæmia or phthisis being discovered, rapidly yields to follicular hormone therapy. In most cases no corpus luteum hormone has been required but, when menses failed to reappear with follicular hormone therapy alone, success followed combined hormone administration. The early response in these cases is encouraging, but return of amenorrhœa is common unless treatment is continued *for at least six months.* This is particularly true when the period of amenorrhœa has been present for six or more months prior to beginning treatment. Age appears to be another factor, success being the more difficult to obtain the nearer the woman is to the menopause.

Exact dosage cannot be stated, but in cases of long-established primary amenorrhœa it must be large at first, prolonged over a period of three to six months and finally be but gradually reduced. A rational objection to the treatment of amenorrhœa and other allied disorders by substitution therapy is the fact that such treatment would at first sight appear to be only symptomatic. Experience shows this to be untrue and, whatever the reason, the repeated imitation of the normal cycle appears to stimulate recovery.

Although not strictly in the text of this communication mention is made to the treatment of *sterility* and repeated early *miscarriage.* Genital under-development with scanty menses has often been cured by hormone therapy. Viewed from this angle it is not surprising that fertilization and pregnancy follow successful treatment in hitherto unhappy cases. Again, owing to the power of corpus luteum hormone preparation both to prepare the endometrium for implantation of the fertilized ovum and to inhibit uterine movements, we may assist nature to no small degree. Furthermore, the results obtained following corpus luteum hormone administration from the very early stages of pregnancy have been most successful. Failure, with expulsion of the ovum, has occurred only once. In this particular instance, the bleeding was so profuse before treatment began that it was reasonable to conclude that the ovum had already become extensively detached from the basal decidua. In treating such cases of repeated abortion large dosage has been used, two intramuscular injections being given each week until at least the end of the fourth month.

In one case in which miscarriages had previously occurred on three occasions between the 7th and 8th months of pregnancy, the corpus luteum treatment was continued until the 38th week with a completely satisfactory result.

The fact that the corpus luteum of pregnancy may be removed during the early weeks of pregnancy without precipitating an abortion appears contradictory in this context. Conclusions cannot be drawn from the normal case to the accidents peculiar to the abnormal, and fœtal structures such as the early placenta are now known to produce large quantities of corpus luteum hormone.

THE MENOPAUSE

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THE average age of onset of the menopause is forty-seven, but in certain families it may be four or five years later. Paradoxically when the incidence of onset is early, it is quite usual for menstruation to continue until fifty, whereas those in whom the onset is much delayed, cease to menstruate at an abnormally early age. The normal physiological changes which result from cessation of ovarian activity need no emphasis. On the other hand, such symptoms as tend to harass 60 per cent. of urban women—the result of biochemical changes or the loss of equilibrium in the endocrine orchestra, whether the outcome of surgery, irradiation or age—are of importance ; for there is a natural tendency to pause too lightly over many manifestations of the menopause—an attitude fraught with risk, at times ending in disaster.

SYMPTOMS

Nervous symptoms may vary from neuralgias, migraine and pains in the breast to high degrees of irritability or melancholia. At times there is complete loss of moral tone—for instance, kleptomania or suicidal tendency. It is possible that atrophic changes in the thyroid gland and pars anterior of the pituitary are responsible for some of the psychoses, the essential fact being an alteration in the balance of the products of the endocrine system. Trousseau epitomized the occasional disorientation of this time of life as follows : " It is not that she cannot, it is not that she will not, but it is that she cannot will."

Vasomotor disturbances, such as hot flushes, cold sweats and hypertension, are well known. These may be due to increased sensitivity to adrenaline or to reduction in the blood calcium content. The occasional increased sexual desire at this time is also perhaps related to vasomotor upset.

Recently it has been demonstrated that a physiological agranulocytosis is apt to occur at the menopause. This interesting feature would seem to indicate that endocrine disturbance has an effect on the bone marrow. Such decrease in polymorphs may explain some of the surgical tragedies at this time and indicates the necessity of a pre-operative blood count.

Not uncommonly during the menopause there is recurrence of hæmorrhagic discharge at irregular intervals. This demands close investigation, for whereas it may be due to a Rip Van Winkle-like awakening of the ovary to chemical stimuli from the hypophysis, it may, on the other hand, presage malignant changes in the ovary, body of the uterus or cervix. At times the discharge may be pink, brown or offensive, indicative of senile metropathia, degeneration of a submucous fibroid or granular vaginitis.

Cutaneous symptoms, such as acne, urticaria and eczema, are not infrequent sources of discomfort, but perhaps the most devastating is the insomnia associated with pruritus vulvæ, for artificial dermatitis may be added to the trophic changes which precede leukoplakia or kraurosis. For many years it has been recognized that the vagina and its epithelium atrophy at the menopause, but it was Papanicolaou, Shorr, Doisy and Allen who called attention to the altered vaginal secretion and the characteristic changes in the vaginal smear and vaginal mucous membrane. They demonstrated the dark staining round cells from the deeper layers of the non-cornified menopausal vaginal epithelium, the constant presence of red blood cells, the cytolysis of the flat epithelial cells and the alteration in the bacterial flora and its PH. They were able to prove incontestably that such changes and their resultant symptoms were in direct relation to the absence of ovarian follicular hormone—a finding of considerable therapeutic and clinical significance.

Arthritis is a very common feature at this time of life. It may be polyarticular, but perhaps is most often seen in the knee, a characteristic finding being a tender fatty thickening just above the inner condyle of the joint. Another frequent source of complaint is backache which may be associated with the lordosis caused by increased gain in weight and abdominal fat. On the other hand it must not be forgotten that prolapse or hernia of the weakening pelvic diaphragm is particularly liable to cause symptoms of dragging pain in the back at this time of life. The etiology of arthritic symptoms is obscure. Some believe they are due to endocrine deficiency; others regard them as a manifestation of a predisposition at middle life to infection and metabolic dysfunction.

Among digestive disorders, dyspepsia and flatulence are common. Pseudocyesis is rare.

TREATMENT

Great care, tact, and judgment are needed in dealing with these patients. In general it is best to discourage the use of sedatives, sleeping draughts and alcohol, lest a habit be acquired. Bromides have been tried for many years and certainly are of value in lessening the nervous irritability, though it must be remembered that menopausal patients are particularly prone to develop rashes. Complete and thorough investigation, with special reference to any gynæcological features, is essential; for there is a general impression among women that irregular bloody discharges are natural during the change of life. Such discharges are not natural —they usually mean inflammation or cancer.

One of the saddest things in gynæcological work is that a large proportion of cases of cancer are beyond the possibility of cure when first examined. In many of these cases it is supposed by the patient, and often by her practitioner, that the slight bloody discharge is natural to the change of life, and so no attention is paid to it. Later, and nearly always too late, they find it is due to serious disease which because of neglect has progressed beyond the stage of real cure.

If the investigation is satisfactory, it is well to inform the patient that many of her symptoms will pass, and that the main object of treatment is to tide her over this difficult period. Some women assure success and gain immunity from distressing disturbances by prescribing for themselves change of scene and fresh mental activities; others have found relief in fads, fancies, and fanatics. It matters not, provided they are happy and become exocentric.

The practitioner hitherto has placed reliance, and rightly so, on whole thyroid gland, half a grain of the extract being given morning and evening on an empty stomach, together with five to ten drops of Lugol's iodine. Metabolism is accelerated thereby, and rheumatic pains are lessened. Massage, a weekly Turkish Bath, and the old-fashioned hot sand-bag or the new Dol's flannel, are also helpful for neuralgias or joint pains. More recently *Grenz* rays, which are soft, long-wave X-rays, have been used with signal success on the Continent. Others have advocated intrapelvic diathermy; but it has been shown that ultra-short-wave therapy is much more effective.

In the plethoric type of patient with hypertension, headache or migraine, relief of symptoms has often been obtained by withdrawing three or four ounces of blood from a vein once a week for a month or longer. This can be done painlessly if the superjacent skin be injected with two drops of one per cent. novocaine, and a Record needle sterilized in paraffin, be used. Others have treated such cases on the old-established lines of giving six grains of blue pill twice a week, followed by a saline draught in the morning.

Such general lines of treatment are, however, often unavailing for the severe case, that type, for instance, in which the menopause is consequent upon irradiation or surgery before the age of forty. Whether the features of such a case demand a psychiatrist, physician or gynæcologist, there would seem little doubt that the symptoms are due to a lack of œstrin and the resultant failure in normal inhibition of the anterior pituitary gland. Admittedly the statement that a morbid menopause is a deficiency disease is a bold one, but there is little difficulty in accepting this view, now that animal experiments have shown that one of the actions of œstrin is to inhibit the activity of that dynamo of function—the hypophysis. Moreover, since œstrogenic deficiency spells derangement of the whole endocrine system, correction of such deficiency will replace the normal inhibition of the anterior pituitary and reco-ordinate the glandular system. The results obtained from the use of œstrogenic substances corroborate this view. Moreover, if need be, results of treatment can be checked and assessed by vaginal smears, for it has been found that morphological changes in the smear from the menopausal to the follicular type are in ratio to the relief of subjective symptoms, and that the optimum smear change corresponds with the maximum clinical improvement. Formerly the treatment with ovarian extract, 5 grains three times a day, was the vogue, but results were negligible, indeed hardly other than were explicable on the basis of psychic suggestion. Recently, however, the isolation of folliculin and the discovery of its chemical formula has clarified the treatment of many hitherto unassailable conditions.

During the last two years I have treated the following states—all were severe cases that had resisted other methods :

	No. of cases.	Cured.	Uncured.	Relieved.
Mastodynia	2	2	—	—
Ano-vulval pruritus ..	8	6	—	2
Emotional instability ..	5	3	2	—
Backache and insomnia..	4	3	—	1
Severe flushes and sweats	6	4	—	2
Leukoplakia	4	1	—	3
Pseudocyesis	1	1	—	—
Kraurosis vulvæ	3	1	—	2

In many, vaginal smears were taken before, during and after treatment. When indicated, the pH of the vagina was tested and the *Trichomonas vaginalis* looked for, but only twice were the flagelates found. The treatment recommended after considerable trial of dosage and method, is 5,000-10,000 units on alternate days, or 10,000-15,000 units every third day, or 30,000-50,000 units once a week of dimenformon, œstroform B or ovex B Leo. These are given intramuscularly for four to six weeks according to symptoms. They are painless and cause no reaction. The only practical point to bear in mind is that they are thick, oily solutions and require a fair bore needle and an all-glass syringe. It is not possible to dogmatize as to the dosage, for some do well on a smaller number of units, while others require the larger; a vaginal smear will, however, indicate the response of any given patient and the necessity of augmented dosage if need be. In general, it may be said that a severe case does best on repeated (even daily) doses. When relief has been obtained, the injections should be stopped or spaced out to allow of spontaneous readjustment in the glandular system. If necessary, they can be repeated after an interval of a few weeks. In the case of nervous patients, injection treatment may be impossible. In such, 10,000-unit tablets of the œstrogenic substances mentioned are on the market, and can be given twice daily for a month—a lesser dose has little effect. It is not unusual for a patient to say she feels worse for the first few days after treatment, so it is therefore wise to warn her of this sensitizing effect beforehand, for soon it is remarkable to see the gain in health and vitality, together with the cessation of such symptoms as pruritus, vaginitis and depression. One other thing should be noted, namely, the possibility of a temporary return of a pseudo-period due to uterine hyperæmia.

During the last year I have supplemented oral treatment in cases of leukoplakia and vaginitis, by prescribing vaginal suppositories of œstrogenic substances, 1,000-2,500 units being inserted at bed time, and followed by a lactic acid douche of one teaspoonful to the pint in the morning. Recently the Organon Laboratories have put on the market a useful vaginal suppository called Kolpon, which combines œstrin with sugar and lactic acid. Given alone, without oral or injection treatment, these suppositories are not of the same value in the adult as they are in the child. Recently, Schneider in America, has reported good clinical results from the use of emmenin, obtained from the human placenta, which Collip suggests is the purest œstrogenic substance. The dose is 20 units three times a day in a small glass of water an hour before meals. Finally it must be remembered that all such endocrine therapy is essentially substitution therapy.

THE RELIEF OF PAIN

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IT is difficult to define pain. The tactile sensation, not at all unpleasant, produced by light pressure of a bristle on the skin, may, if rapidly repeated, after a short time, cause intense discomfort, which is called pain. Such an impulse ascending from the periphery to the sensory centres in cord or brain may cause overflow of the stimuli into the neighbouring centres in the grey matter, and thus set up further sensations of a painful nature in neighbouring and even distant areas. Thus a carious tooth, or an antral abscess, will at first cause pain referred locally, but ultimately the painful sensations may spread over the whole trigeminal area and even down the neck and arm to the fingers. Similarly, visceral disease, through afferent pre-ganglionic sympathetic fibres, may reflexly through spinal centres set up pain and hyperæsthesia in cutaneous areas.

The individual appreciation of pain, or the threshold of consciousness of pain, may be raised or lowered according to individual temperament, and varying conditions of environment. Pain may be inhibited altogether by intense emotion, as in battle, or by hypnotism, or again pain may be self-inflicted and invited through a distorted mental outlook, as in masochism, or in states of mental exaltation or religious fervour. Pain, therefore, cannot be measured and compared in different individuals, or even in the same individual at different times. A rough standard may be taken as to whether sleep is prevented by the pain or not, and if during the day the attention can be distracted from it by interest in business, games, or other activities. There can be little doubt that the savage or a stolid rustic feels pain less : that is, he is less emotionally disturbed by physical injury than the more highly-strung brainworker, especially if of Jewish or Latin ancestry.

The cranial nerves concerned with afferent painful sensations are the fifth or trigeminal, the seventh or facial, the ninth or glossopharyngeal, and the tenth or vagus. Painful stimuli are carried centrally in the trigeminal nerve by all its sensory branches, by the recurrent meningeal branches as well as the three divisions supplying the face. Complete destruction of the fifth nerve abolishes all sensation in the face and front half of the head, including deep pressure, on eyeball, forehead, cheek and jaws and half the tongue. Other cranial nerves also carry sensory impressions, the pars intermedia Wrisbergi bundle of the seventh nerve carrying tactile and painful impressions from the tympanum and posterior wall of the meatus and pinna, and also gustatory fibres from the anterior two-thirds of the tongue by the chorda tympani, as well as from the palate by the Vidian nerve. The ninth, or glossopharyngeal, supplies with sensation the upper portion of the pharynx, the fauces and tonsils, back of the tongue and the uvula, and back edge of the soft palate. The vagus also, in addition to its wide distribution to the lungs, heart and viscera, carries some sensory fibres from Arnold's nerve at the back of the pinna. Spinal nerves behave in a similar manner; those carrying pain and temperature sense in the posterior roots separate on entering the cord from those serving tactile and light pressure and vibration, and end in the grey matter of the posterior horn, thence being relayed and decussating across the middle line to run centrally in the opposite antero-lateral portion of the cord as the spino-thalamic tract to reach the thalamus. The operation of *chordotomy* is sometimes done to divide this tract for the relief of intractable pain in the pelvis or opposite lower extremity.

Pain is a protective mechanism, and when areas of skin become analgesic as a result of destruction of the pain fibres, as in syringomyelia, then slight injuries are unattended to and may lead to abscesses, or burns are unnoticed and damage sustained that might have been avoided.

SYMPATHETIC SENSORY CONDUCTION AND GANGLIONECTOMY

Those parts of the body are supplied by pain fibres in which such recognition of painful stimuli is necessary, such as the skin and muscle and skeleton. Those parts which are normally protected from external stimuli, such as the brain and viscera, have no perception of tactile, painful or temperature stimuli, and the brain may be cut and handled, or the viscera cut or burnt, with complete indifference. Yet these same viscera may be the seat of intense pain from muscular cramp in renal or biliary or intestinal colic, conditions to which they may at times be subject, and consequently the splanchnic nerves which carry these painful impulses may sometimes be divided surgically with great alleviation of pain in abnormal conditions. It is now being generally recognized that painful impressions may be carried centrally over the sympathetic tracts, and numerous cases have been recorded in which severe pains about the head and neck have been cured by excision of the superior cervical sympathetic ganglion and its branches, while Raynaud's disease and certain cranial neuralgias may be cured by excision of the inferior cervical or stellate ganglion with, perhaps, the upper two or even three dorsal ganglia.

In the lower limbs and pelvis the severe pains associated with *thrombo-angiitis obliterans* and its consequent gangrene of the toes and foot, or the pains of dysmenorrhœa have been cured by ganglionectomy of the third and fourth lumbar sympathetic ganglia.

MEDICINAL SEDATIVES

Treatment by sedative drugs must be used with discretion. Before numbing the consciousness of pain with sedatives, a serious attempt at diagnosis of the cause must be made, and especially in cases of abdominal pain it may be fatal to mask the symptoms by administering opium. With the exception of opium (and its derivatives morphine and heroin), the salicylates, quinine and cocaine, analgesic drugs are for the most part those manufactured from coal tar, such as aspirin, phenacetin, phenazone, pyramidon, and others. These may often be combined usefully with hypnotic drugs such as veronal. A valuable combination in cachet form is seven grains of pyramidon (amidopyrine) with three grains of medinal and one-eighth or one-sixth grain of heroin. This may be considered as the last line of defence before morphine injections become necessary, and is especially useful in the severe pains of acute brachial neuritis or sciatica, and in the more painful migraine headaches. Before using such powerful remedies, the milder combination of aspirin, phenacetin and caffein, with or without the addition of codeine, should always be tried. Thus the order of trial may be : (1) Aspirin, quinine and salicylates. (2) Aspirin, phenacetin and caffeine (A.P.C. tablets) or empirin co. (3) Phenazone (antipyrin), phenacetin, pyramidon (amidopyrine), acetanilide (antifebrin), saridone. (4) A.P.C. and codeine (veganin, treupel tablets). (5) Veramon (amidopyrine with veronal). (6) Pyramidon with medinal and heroin. (7) Morphine, or morphine and scopolamine injections.

PHYSIOTHERAPY

Rest is often all-important, as in the pain of an acute arthritis, or neuritis. Of the various electrical treatments—galvanism, faradism, diathermy, short-wave radiotherapy, static electricity, high-frequency currents, and X-rays—each may succeed in certain chronic cases of neuritis, arthritis and other neuralgic states, such as certain headaches. Radiant heat, infra-red rays, and ultra-violet light are favourite treatments in some hands. The last-named, like X-rays, requires special care in dosage and application, and should not be given by unqualified persons. Various bath and douche treatments, such as the deep saline baths of Droitwich, mustard or sulphur baths, aromatic baths, and hot and cold douches may be supplemented by radio-active, hot mud applications, known as the " fango " treatment, as given at Acqui, Abano, Pistany and numerous spas abroad, and at Harrogate in this country.

Massage and manipulative treatment alone would require separate chapters for adequate description, but a word of caution may not be amiss against too early employment in acute diseases, such as sciatica, brachial neuritis, and joint inflammation. I should also like to enter a protest against some of the more violent methods of manipulating the spine which are now in vogue. I have known permanent pelvic damage produced, and a spine fractured by such violence.

NERVE BLOCK AT PERIPHERY

In addition to the cutting of sensory nerves by surgical operation, the passage of afferent impulses along them may be blocked by various local anæsthetics applied either to the nerve endings in the skin or other tissues, or else injected in large quantity around the nerve trunks so as to produce infiltration of the nerves by the drug, a process which may take some twenty minutes, or else a small quantity of the drug may be injected into the nerve trunks themselves. As an example of peripheral nerve block, the treatment of an aching tooth due to dental caries may be mentioned. A mixture of equal parts of carbolic acid, oil of cloves and menthol makes an oily liquid, a couple of drops of which placed in the tooth cavity will quickly arrest the pain. Before doing this, the inside of the dental cavity should be roughly cleaned from detritus, e.g. of food, before gently mopping the cavity with a piece of wool twisted on a probe or a pointed wooden match and moistened with the analgesic mixture.

Alcohol injections for pruritus vulvæ have been done, in which the alcohol is injected close underneath the skin to involve the nerve endings of the affected part, and A.B.A. or proctocaine may be similarly employed.

The application of cold compresses and cold water is an extremely useful method of treatment for burns of the skin and for sprained joints. It is far better to put the damaged part completely under cold water, as in a bucket, and if necessary the limb should be kept in it for hours continuously, as it is quite possible to sleep with the wrist or ankle hanging in the cold water.

In acute lumbago often immediate relief can be obtained by local injections into the tender muscular areas of 10 or 15 c.cm. of 1 per cent. procaine solution. A.B.A. or proctocaine can be similarly used in smaller quantity. Often the relief is instantaneous and dramatic.

Nerve trunks may be anæsthetized by intraneural injections of novocaine, or with alcohol. If alcohol is used, the conditions must be carefully considered first, as to whether the lasting nerve paralysis produced by the alcohol is advisable. For instance, the superior laryngeal nerve may be injected with alcohol in cases of tuberculous laryngitis when the involvement of the epiglottis causes swallowing to be extremely painful. Sciatica, however, must never be treated by injecting alcohol into the nerve trunk, on account of the severe paralysis of the leg muscles it would produce.

In causalgia affecting the hand due to peripheral lesions of the median nerve, it is sometimes possible to bring about immediate relief by injecting the median nerve above the wrist, where it lies between the palmaris longus and the flexor carpi radialis tendons. Two or three drops of novocaine should be first injected, followed after a minute with 10 minims of 90 per cent. alcohol. In chronic fibrositis around the shoulder and lumbar regions, alcohol piqures are sometimes extremely useful, but they should only be used after carefully examining for tender points on pressure. In cases of diffuse tenderness alcohol injections are useless.

In chronic sciatica the nerve may be injected with 2 c.cm. novocaine at the sciatic notch, or at the level of the tuber ischii, causing temporary numbness of the foot and leg and dropped ankle. After injecting with novocaine, it is a good treatment to follow up with 60 c.cm. or 70 c.cm. of warm normal saline. This inflates the nerve and separates the adhesions forming between the intraneural bundles, without producing any paralysis.

An alternative sometimes of value is *epidural* injection of novocaine and saline. From 50 to 100 c.cm., or even more, of weak novocaine and saline are injected into the sacral canal through the sacro-coccygeal foramen in the middle line. This space is outside the spinal dura as the thecal sac ends at the lower level of the first piece of the sacrum. The liquid is forced around the sacral and lumbar roots outside the spinal theca. Usually little or no pain is produced, but if much pain down the leg is produced the injection should be stopped.

Nerve stretching under a general anæsthetic gives relief in some chronic cases, by forcing the leg up to a right angle with the trunk, or even higher, with the knee held straight.

A resistant form of sciatica is the contralateral scoliotic type, or high sciatica, in which the spine is laterally flexed away from the painful leg. In this type the Achilles jerk is usually unaffected. Not infrequently the pain and deformity continue for a year or more. If prolonged rest in bed is not followed by gradual improvement, a plaster jacket carefully put on during tension on the spine, and worn for six weeks may bring about a cure. Usually the pain lessens after the first few days of discomfort, but it is a treatment more suitable for winter than the summer months.

Paravertebral injections of alcohol have given relief in angina pectoris and in aortic pain. In such cases five 2¾-inch needles should be available, and these are inserted at a distance of 2½ inches from the middle line on the left side down to the upper five ribs, after previously anæsthetizing the skin with intradermal novocaine punctures. Care must be exercised in finding the rib, so as not to slip the needle between two ribs to the pleura. When the rib has been found, the needle should be slipped over its lower edge and should be turned inwards at an angle of 45° and passed inwards towards the intervertebral foramen for a distance of about 1½ inches, though this varies according to the muscularity of the subject and the amount of subcutaneous fat. 1 c.cm. of novocaine should be injected and the needle left in situ, beginning from above and then repeating the process downwards for five ribs, then 2 c.cm. of 90 per cent. alcohol should be injected in the neighbourhood of the intervertebral foramen, beginning at the uppermost. This involves the sympathetic branch, or white ramus, from the spinal nerve, with resulting relief of the cardiac pain. In addition there will be an area of cutaneous anæsthesia over the scapula, and to a less extent along the axilla towards the sternum.

INTRATHECAL ALCOHOL INJECTIONS

Intractable pain in the lumbo-sacral or even the brachial areas due to carcinoma or other inoperable conditions may be treated by intrathecal alcohol injection by Dogliotti's method. This method depends on absolute alcohol being much lighter than, and floating upon the cerebrospinal fluid when injected, and thus it may be made to reach the nerve roots concerned in the painful areas. The patient must lie upon his side horizontally and should be so arranged that the spine is curved to bring the apex of the curve to the level of the nerve roots to be treated. Particular care must be taken that the head is kept low, so that there shall be no danger of the light alcohol rising up into the cranium. The affected side must be uppermost, and spinal puncture must then be done carefully, near the point requiring treatment, and as soon as the cerebrospinal fluid flows, the orifice of the needle should be closed with a stilet so as not to lose any fluid. The alcohol syringe is then fitted on, filled with absolute alcohol, and from 0·5 c.cm. to 1·5 c.cm. may be injected. After the injection the patient should be kept in the same position for an hour at least, by which time the alcohol will be disseminated throughout the cerebrospinal fluid and will have lost its potency. Meanwhile the strong alcohol has surrounded the affected nerve roots, and the treatment is often very successful in arresting pain that otherwise seems intractable. Temporary weakness of the bladder and bowel, with retention of urine, is not unusual for a week or two following lumbo-sacral injection.

TRIGEMINAL, MIGRAINOUS AND POST-HERPETIC NEURALGIAS

Drugs are of little value in severe cases of paroxysmal trigeminal neuralgia, but in the early stages tincture of gelsemium in 15 to 20 minim doses t.d.s. is sometimes useful. Opium should be avoided, if possible, on account of the danger of the drug habit being acquired. Migrainous and post-herpetic neuralgias should be treated at first by luminal and other analgesics and sedatives in combination, and a thorough trial given. In the more severe cases, which do not respond favourably to drug treatment, the advisability of alcohol injection of the Gasserian ganglion may be considered. The fifth cranial nerve, which supplies the front half of the head with sensation, including the meninges, may be injected successfully with strong alcohol for chronic paroxysmal neuralgia of the face, known as trigeminal tic, and also in many cases of migrainous and ciliary neuralgia, and for certain cases of post-herpetic trigeminal neuralgia.

For *trigeminal tic* the main nerve trunks of the two lower divisions may be injected at the foramen rotundum and the foramen ovale, or else the Gasserian ganglion itself may be injected by passing the needle through the foramen into the ganglion, and a permanent cure produced. In those cases of trigeminal tic which involve the upper division, in which the pain affects the eyeball as well as the frontal area, it will be necessary to inject the Gasserian ganglion itself, as supraorbital nerve injection is of only temporary benefit or else does not control the pain at all. In many of the cases in which the upper division is notably involved, it is the upper and second divisions which require treatment, and the third division may then not be affected. It is possible in such cases to inject the inner two-thirds of the ganglion and to leave the third division unaffected by the alcohol. This will be a great advantage to the patient, as preservation of sensation on the lower jaw and tongue is of the utmost value to him in eating.

There are two routes by which the foramen ovale may be injected, either laterally through the sigmoid notch or else by the anterior route in front of the coronoid process. The latter method is longer, requiring a 4-inch or 10-cm. needle, but it is more certain in enabling proper penetration of the foramen ovale, owing to the steepness of the line of approach. By the lateral route the elevation of the needle is limited by the height of the sigmoid notch and the mandible, and it may be very difficult to pass the needle through the foramen ovale by this method. A word of warning, perhaps, is advisable against attempts at injecting the foramen ovale by persons who have had no experience of this treatment, and it should never be attempted without some training in the method and practice on the cadaver.

If for any reason it is found impossible to inject the nerve trunk or the Gasserian ganglion satisfactorily, the neurosurgeon may resect the sensory root of the trigeminal nerve close behind the Gasserian ganglion. In the majority of cases a subtotal resection, leaving the inner ophthalmic fibres uncut, will be all that is necessary to obtain a permanent cure, but in those cases in which the ophthalmic division is involved in the neuralgia the whole root should be severed.

In rare cases a similar type of neuralgia involves the *glossopharyngeal* nerve. Alcohol injection should not be attempted in these cases, but the nerve may be avulsed after dissecting it out carefully down to the jugular foramen, with the best results.

In many cases of *migrainous neuralgia* and that variety which I call *ciliary neuralgia*, in which the eyeball is particularly involved in the pain, the neuralgia affects the upper two divisions of the trigeminal nerve, rarely the lower third division. These cases of migrainous neuralgia appear to be an anterior form of migraine, probably associated with vasomotor spasm of the middle meningeal artery, the pain being referred from the meninges along the afferent recurrent meningeal branches of the trigeminal nerve. The pain differs in character from that of trigeminal tic, in that the attacks of pain are more prolonged, the shortest of them being at least ten minutes, and much more often the attacks of pain last an hour or more, though several attacks may occur in the twenty-four hours. The attacks are not brought on by eating, talking, or handling the face, and there are no trigger zones as in trigeminal tic, in which light touches on certain areas, such as the ala nasi and upper lip or eyebrow, will start off the neuralgic spasms.

Herpes zoster not infrequently attacks the trigeminal nerve or more probably the Gasserian ganglion itself. It is the upper division particularly which is usually involved, the second rarely, and sometimes the third division only. A frequent sequel of the zoster attack is hyperæsthesia of the affected area to light touches, so that with the upper division the use of a hair brush or the touch of a hat, or draught of air on the temple and forehead cause intense pain. In addition spontaneous pain is an occasional sequel of herpes zoster, and is known as post-herpetic neuralgia. These spontaneous pains are not so easily relieved by numbing the Gasserian ganglion, but the hyperæsthesia can be entirely cured by this treatment, giving great relief. When the first division is involved, then care should be taken to inject the inner portion of the ganglion only with alcohol. Zoster affecting the spinal nerves cannot be treated in this way, and it has been found that even posterior-root section does not cure the spontaneous pains, nor does it even relieve the hyperæsthesia unless at least five roots are divided.

There is a danger in attempting too much by local treatment. All forms of electric treatment, including ultra-violet light and X-rays, are apt to aggravate the pain, and massage is also worse than useless. Practically, in cases of post-herpetic spinal neuralgia we are dependent upon mild analgesic drug treatment, in the hope that with the lapse of time the pain may diminish and finally disappear. In old people, however, it is not uncommon for some pain to persist indefinitely.

ABDOMINAL PAIN

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ABDOMINAL pain means pain felt by the patient in his abdomen and includes the associated symptoms of tenderness and hyperæsthesia. This pain usually arises, either in some part of the abdominal cavity, the organs lying within it or the peritoneum lining it, or in the kidneys and ureters which, though they are outside the peritoneum, yet lie in the general muscular compartment of the abdomen. But it may also have its origin in the muscular or bony framework, or be the result of a painful impulse arising elsewhere in the course of the sensory nerves supplying the abdominal walls or contents, and referred by the patient to his abdomen.

THEORETICAL CONSIDERATIONS

There have been many theories to explain abdominal pain, for theories flourish where facts are hard to come by, and there is no very exact knowledge of the anatomical paths whereby this pain travels. Planned experiment is impossible in man, and the theories which are accepted to-day have been slowly built up on the facts accumulated by clinical observation and on the limited experimentation of operations under local anæsthesia. Two nervous systems are concerned, the cerebrospinal and the autonomic. The motor side of the autonomic system, served by two neurones histologically distinct, the connecting link between which can be paralysed by nicotine, lends itself readily to experiment, but the sensory side offers no such facilities. The fibres are myelinated, they arise from the bipolar cells in the posterior-root ganglia of the cord, and they are distinguished only by a slightly smaller average size from those of the cerebrospinal system.

The abdominal viscera and the peritoneum covering them are insensitive to mechanical stimuli, to cutting, pinching, burning, freezing, or to chemical agents. Lennander and Mackenzie believed them to be entirely insensitive, but Hurst has demonstrated that pain is produced by the appropriate stimulus, stretching of their muscle fibres. The parietal peritoneum, on the other hand, is sensitive to all mechanical stimuli, in fact, to all those circumstances which cause pain when applied to the surface of the body. The threshold value, however, is lower, and light contacts, such as stroking with a gauze swab, which on the surface of the body would evoke the sensation of touch only, cause acute pain when applied to the parietal peritoneum. The existence of visceral pain, felt deeply, arising in the organs themselves, and travelling by splanchnic nerves; and of somatic pain, felt on the surface, and due to stimulation of cerebrospinal nerve endings in the parietal peritoneum can therefore be accepted as proved. There is, however, an intermediate problem, that of pain arising in some lesion of a viscus but felt by the patient on the surface of the body. Mackenzie, who denied the existence of visceral pain entirely, considered that all such surface pain was due to a viscero-sensory reflex, by which painful stimuli from a viscus passed up through the splanchnic afferent fibres to the spinal cord, and there set up by radiation an irritable focus, and so, lowering the threshold, produced cutaneous hyperalgesia in the skin of the abdominal wall supplied by the somatic nerves that entered the affected segments of the cord. Mackenzie's view was further elucidated by Head who mapped out areas on the surface of the body corresponding to the viscera, tenderness in which suggested an affection of the corresponding viscus. Mackenzie's and Head's concept of the viscero-sensory reflex has had great influence on surgical teaching, and appears to be accepted to some extent to-day by John Fraser, Ryle, and Fagge. Morley thinks otherwise, and I have come to accept his views on abdominal pain, not merely because of his reasoning, but because a long experience of operating under local anæsthesia has led me to believe them correct.

Morley agrees that there are two types of abdominal pain, visceral and somatic, the one carried by sympathetic nerves, the other by the nerves of the cerebrospinal system and felt in the area of cutaneous distribution of those nerves. He does not believe, as have many others, that painful impressions carried by afferent nerves of the visceral system are ever referred to the area supplied by the cerebrospinal system. It is in this last particular that he differs fundamentally from the school of Mackenzie and Head.

Visceral pain is due to abnormal tension in plain muscle fibres. It is deep seated, vaguely localized, not referred to the surface of the body, described with difficulty. It is unassociated with any tenderness, superficial or deep, or with muscular rigidity. It is relieved rather than aggravated by pressure. Accurately localized pain, tenderness, whether superficial or deep, and muscular rigidity are entirely concerned with the cerebrospinal nerves, stimulated through their sensory endings in the parietal peritoneum, and are unconnected with the autonomic system.

It is necessary to define, as Morley does, exactly what is meant by referred pain. Splanchnic pain is vaguely localized, the site from which it appears to originate being roughly that of the embryonic position of the organ in which it arises; thus all splanchnic pain arising in the fore-gut and its derivatives, the buds which form the pancreas and biliary apparatus, is felt in the epigastrium; all pain arising in the mid-gut loop round and above the umbilicus ; all pain in the hind-gut, between the umbilicus and the pubis. Painful contractions of the gall-bladder will be felt in the midline above the umbilicus, those of the transverse colon above the pubes. But the sites from which these pains appear to the patient to originate are vague and deep. They should rather be described as inaccurately localized than as referred. Referred pain is that which, arising in a lesion of a viscus, is felt in a definite localized area on the surface of the body. Such referred pain, in Morley's view, is always caused by stimulation of the parietal peritoneum by the offending viscus, and not by any sensation arising in it. The practical importance of this hypothesis is much greater than that of most theories in medicine. If Mackenzie and Head are right, the identification of an area of pain and tenderness on the surface of the body indicates the organ whose disease is causing that tenderness ; if Morley is right, surface tenderness indicates not the organ causing the trouble, but the part of the abdominal cavity in which the trouble lies. It may be the organ normally inhabiting that part; it may equally well be another which has come to lie there. To give a concrete example : in a recent manual on the acute abdomen the following statement is made :

> " In acute appendicitis . . . the pain after six to twelve hours, passes to the right iliac fossa, and is now associated with tenderness on pressure over the classical spot of MacBurney. This pain and tenderness do not alter in position with the different positions of the appendix."

If Head is believed this statement is true : if Morley, tenderness at MacBurney's point means only that an inflamed appendix, or some other inflamed structure, lies under that point.

DIFFERENCES OF OPINION

While I consider that Morley's views on the mechanism of abdominal pain are well founded, and have myself accepted them, there are a few details on which a divergence of opinion is still permissible. Hurst, who laid the foundation of our knowledge of splanchnic pain as an entity, believes that there is also true splanchnic tenderness. He has shown, and many others have since confirmed his statement, that the point of tenderness found in gastric and duodenal ulcer, and in appendicitis, corresponds exactly to that of the lesion as demonstrated on the fluorescent screen, and shifts with the lesion if this can be displaced, and he infers from this that the lesion is itself tender. Kinsella in Australia supports this view, but Morley asserts that the tenderness is due to the stimulation of a sensitive parietal peritoneum, brought by the examining finger into contact with an inflamed surface. Here I agree with Morley. For many years I have operated on all gastric and duodenal ulcers under local anæsthesia alone. After anæsthetizing the abdominal wall and opening the peritoneal cavity, I have often felt and pinched the ulcer with my fingers before injecting the splanchnic plexus, in order to assess the scope of the proposed operation. On no occasion has the patient shown any sign of being aware of such manipulations. It might be argued against Morley's view that the finger-pressure could not bring the abdominal wall into contact with any but a superficial lesion. But the peritoneum is sensitive to contact with any surface that differs in the slightest degree from its normal environment,—other peritoneal surfaces equally smooth. Pain will be felt when it is brought into relation, not merely with an active ulcer or a distended appendix, but with the slightly œdematous tissue which may lie at some distance from the seat of trouble.

The peritoneum supplied with sensation by cerebrospinal nerves embraces that which covers, not only the anterior abdominal wall and diaphragm, but the posterior wall, the lesser omentum of the stomach, and the mesenteries of the small and large intestine to within an inch or two of the gut. Zachary Cope[1] has expressed the view that the posterior parietal peritoneum is less richly supplied with nerves, and therefore less sensitive, than the anterior. Morley throws doubt upon this statement, but my experience, based upon some 300 laparotomies carried out under local anæsthesia alone, leads me to agree with Cope. I have found that the peritoneum covering the posterior abdominal wall and the mesenteries is insensitive to gentle handling with the gloved fingers, a stimulus that would provoke severe pain on the anterior wall. Of the mesenteries, in that of the transverse colon alone have I found the sensation of pain at all well developed. This relative insensibility of the peritoneum covering the posterior abdominal wall, explains many clinical observations that are almost commonplace : why perforation of an ulcer into the lesser sac is so much less dramatic than perforation into the general peritoneal cavity; why inflammation of the pancreas may cause so little pain that it presents itself as a peritonitis of unknown origin; why a strangulated femoral hernia may pass for an intestinal obstruction of obscure origin owing to the absence of any local pain in a sac whose peritoneum is drawn from that covering the iliac fossa, whereas an inguinal strangulation is invariably recognized by the combined picture of splanchnic pain arising in the damaged intestine and intense local pain due to pressure on the anterior parietal peritoneum at the internal ring.

One remaining point in Morley's creed I would most respect-

> fully question, or rather accept with some mental reservation; that is, his categorical rejection of referred pain of splanchnic origin. The two instances on which I would prefer to reserve judgment are the infra-scapular or inter-scapular pain of gall-stone colic, and the hyperæsthesia of an early appendicitis.
>
> Some fifteen years ago I made some direct observations on the sensation of the gall-bladder. At that time the operation of cholecystectomy was more often performed than it is to-day. I took the opportunity afforded by a series of such cases, of introducing a small rubber balloon on the end of a fine glass tube deeply into the gall-bladder. When the balloon was inflated, the patients experienced pain. In most cases this pain, as might be expected, was felt over a diffuse and inaccurately localized area in the epigastrium. In one patient, however, a simultaneous pain was felt in the back, between the lower angles of the scapulæ, and was accompanied by hyperæsthesia to the stroke of a pin in the same area. Here the element of infection was absent, and that of stimulation of the parietal peritoneum very improbable. Again I have on one or two occasions found hyperæsthesia in the triangle between the umbilicus and Poupart's ligament on the right side in cases in which the appendix was subsequently found to be obstructed but uninflamed, for example, packed with thread worms."

Observations such as these lead me to keep an open mind on the subject of visceral referred pain. I would not set up my opinion against that of Morley, nor would I lay any great stress on my agnosticism. For referred visceral pain, if it exists at all, is so inconstant and unreliable that it is of no real help in diagnosis. Brought up in the Mackenzie tradition, I spent many years in the routine search for areas of hyperæsthesia, seldom rewarded by any findings at all, and never that I can remember by any of real value.

CHARACTERS OF ABDOMINAL PAIN

Since pain is caused by a peripheral stimulus, but felt, after passing through three neurones, in the cerebral cortex, its quality will vary, not merely with the transmitting agent but with the receiving apparatus; that is, with the mental background, courage, and general health of the patient. If no description of the nature of pain can approach to accuracy, so also no reliable method of tracing its source is available. Professor J. A. Ryle has, I think, done more than anyone of this generation to elucidate the significance of pain from the clinical as distinguished from the neurological aspect. An analysis will allow the separation, provisionally, of the following characters in any pain; its nature, its severity, its site, its periodicity, its time relations, the manner of its onset and departure, its duration, the sites if any to which it is referred, the factors which aggravate and those which relieve it.

The *nature* of any pain should permit the determination in most cases whether it has the general characters of splanchnic or of somatic pain. If it is splanchnic it may be possible to say whether it is the colic of a muscle working against difficulties or the spasm of one faced with a complete block. If it is somatic it is sometimes possible to hazard a guess as to whether the responsible stimulus is mechanical, bacterial, or chemical; for instance, whether the parietal peritoneum is being irritated by blood, pus, or gastric contents.

Its *severity* may give important information. Here each practitioner must build up his own scale of values. In my experience the pain of a perforated peptic ulcer is the most agonizing which the human being is ever called upon to withstand; it is the only one which will make a strong man drop to the ground; motionless and voiceless. Second in intensity I would put gallstone colic, and third renal colic; fourth, and not certainly standing in its severity above various types of alimentary colic and peritonitis, I would put the pain of acute pancreatitis. Others would disagree. I put this grading before a meeting at which Sir David Wilkie was present, and he said that, having himself experienced both renal and biliary colic, he considered the former to be more severe. Moynihan stressed the agony of an acute pancreatitis, which I understand he put first. My experience of this disease has left me with the impression of a pain which is grievous but not agonizing, moderate when compared to the damage subsequently disclosed; indeed, the mildness of the pain when contrasted with the patently critical condition of the patient and the evidence in the abdomen of a general peritonitis, is its chief characteristic.

The *site* of the abdominal pain will often give a clue to the site of its origin. Splanchnic pain is felt in an area which betrays the embryonic rather than the present position of the outraged viscus; midline organs, the alimentary canal and all its associated glands, refer this pain to the mid-line, those developed laterally, that is, the genito-urinary system, to the side. Within these regions the upper portions refer their pain higher than the lower; the œsophagus to the episternal notch, the stomach, duodenum, pancreas and biliary system to the upper epigastrium, the small intestine, appendix and cæcum to the lower epigastrium and umbilicus, the large intestine to the hypogastrium, the kidney to the loin, radiating as it gets more severe to the flank and iliac fossa, the ureter to the groin and external genitals, the bladder to the suprapubic region in the mid-line. Somatic pain is felt in the area of skin supplied by the cerebrospinal nerve the sensory endings of which in the peritoneum are receiving the painful stimulus. In most cases the site of pain will correspond anatomically to the site of the lesion, but there is a notable exception in the case of the diaphragm. This is a cervical organ, drawn down into the abdomen to reinforce the efforts of other muscles in parturition; a painful stimulus applied to the diaphragmatic peritoneum travels by the afferent fibres of the phrenic nerve and is felt in the area of distribution of the fourth and fifth cervical nerves, over the base of the neck and the acromion process.

By the *periodicity* of pain is meant its distribution in the time sense surveyed over a long interval. This periodicity is therefore of importance in the chronic rather than the acute lesions of the abdomen. Thus an almost unnoticed onset followed by a gradual increasing intensity of pain, an inexorable advance with no appreciable remissions, speaks of cancer. The pain of ulcer will occur in bouts, which rarely last less than a month, separated by intervals of freedom lasting anything from a month to several years. During the bout the pain recurs regularly day after day, with no holidays; during the intervals it leaves no reminder. Gastric pain which disappears for a day or two is rarely due to an organic lesion of the stomach or duodenum. Long remissions favour duodenal, short ones gastric ulcer. Appendicular attacks are scattered irregularly, rarely lasting less than forty-eight hours or more than a week, not often coming more than two or three times a year, and showing no constant interval. Gall-bladder attacks tend to be of moderate severity at first, but to become more frequent and severe with repetition; the intervals between them obey no rule. Pain arising in the tubes and ovaries tends to follow a regular monthly cycle, usually being at its worst immediately before the period. The pain also of any inflammatory focus, such as an infected pelvic appendix or colonic diverticulum, which lies in contact with the female genital organs will be increased by their pre-menstrual engorgement and show the same monthly periodicity.

By the *time relations* of a pain are meant its behaviour when analysed over a period of twenty-four hours, and especially its relation to environment or to the function of any abdominal viscus. The most familiar example of such a time-table is the regularity with which gastric or duodenal pain follows meals : a clock-like punctuality is suggestive that the lesion is in the stomach or duodenum, but it must be remembered that a meal is the signal for awaking peristalsis throughout the alimentary tract. The lower ileum empties into the cæcum, the colon undergoes mass peristalsis. Any lesion of the large intestine may therefore give the symptom of pain related to meals. Pain which is present on waking and disappears during the day is often due to low grade " infection "; that coming on towards the evening to insufficient support of some unfixed and overloaded viscus. Pain which appears at week-ends suggests a slight obstruction aggravated by heavy meals : that which is only then absent is probably a spastic condition induced by overwork or mental anxiety.

The *onset* of many abdominal affections is typical. Gall-stone colic comes with dramatic suddenness, appearing at any hour of the day or night, unheralded and evoked by no known circumstance, reaching maximum intensity within a few minutes of the first twinge. At the other extreme the pain of ulcer never appears suddenly, but will take anything from a week to a month to pass from the stage of discomfort after meals to that of fully developed ulcer pain. The onset of appendicitis is usually so typical, umbilical splanchnic pain followed by fixed somatic pain wherever the appendix may lie, that the diagnosis is rarely missed unless the somatic pain is absent.

The history of the way the pain *disappeared* after an attack may give a clue as to the nature of the trouble. An inflammatory lesion can only right itself gradually; the pain of an ulcer fades away as slowly as it appeared, that of an inflamed appendix can never remain severe for three days and be gone the next. A colic ceases as suddenly as it has started, but is very apt to reappear after an interval of a few hours. While the real pain of a colic stops abruptly, it often leaves a soreness behind, which the patient describes as feeling " as if he was bruised or beaten." This cycle—abrupt onset, abrupt termination, residual soreness—is typical of the pain caused by stones in the gall-bladder and kidney.

The *duration* of a pain may be of considerable diagnostic value : it is much associated with the manner of onset and disappearance. Many will remember the rhyme inscribed above many old-fashioned barometers, " Slow come, long last; short warning, soon past." This is also true of abdominal pain. In general the short-lived pains are due to mechanical causes, that is, they are colics; the enduring ones are caused by organic changes, bacterial or neoplastic. This duration of the pain is often the deciding factor in the differentiation of minor pains in the right iliac fossa. Those which recur nearly every day, and last for a few minutes to a couple of hours, can hardly be due to trouble in the appendix, trouble which, while it may have a mechanical origin in a stricture or fæcolith, usually has an infective element added. Their most common cause is distension by rapidly ejected ileal contents of a cæcum which is unfixed, of poor tone, and inefficiently supported by flabby abdominal walls, a disease which American authors call the " blue cæcum."

The matter of *sites of reference* is one to which allusion has already been made. Without denying, as Morley does, the existence of referred visceral pain, I think it is extremely infrequent. I have been unable to accept Head's areas, or to satisfy myself that the time spent in mapping out zones of hyperæsthesia would not be employed to better purpose in pondering over the significance of more important data. Real localized surface pain, tenderness, and muscular guarding are, however, of great value. Taken in conjunction with the other characters of the pain which are discussed above, it will often permit of the diagnosis not only of the exact pathological nature of the causative lesion, but of its anatomical site. Thus, when a woman who has had an attack of agonizing pain in the epigastrium, starting suddenly and accompanied by unproductive retching, later develops severe localized pain at the right costal margin near the linea semilunaris, tenderness on pressure at this spot, and rigidity of the upper half of the right rectus, it is clear, not only that she is suffering from gall-stone colic, but that the element of infection is added to that of obstruction, that the gall-bladder is distended, and that it is lying in contact with the abdominal wall. When a patient who for several weeks has suffered from cramp-like pains coming on two hours after meals and relieved by taking more food, starts to complain of a fixed pain over the right shoulder, it is known, not only that he has a pyloric or duodenal ulcer, but that his ulcer has become fixed by inflammatory œdema, or has actually eroded, the right crus of the diaphragm.

The factors that *aggravate* or *relieve* a pain already present will often give further help. Any aggravation or alleviation of pain by the function of some organ suggests that that organ is affected by the pain-producing lesion or is in close proximity to it. Pain made worse or relieved by food probably arises in the stomach ; pain only felt when the bladder is full and disappearing when the urine is passed warrants the belief that some inflamed structure, such as a diseased appendix or a pyosalpinx, is lying in contact with its walls. Aggravation by change of position presupposes a mechanical cause. The pain of a gall-stone is often made worse by lying on the left side : that of a renal stone is increased by lying on the sound side and relieved by the reverse position, because the pelvis is more sensitive than the calyces. The pain of ptosis is brought on by standing and tends to become more insistent towards the end of the day; it is relieved by lying down. Sudden jolting is apt to start a renal stone on its painful downward passage.

A young Oxford blue who, owing to the presence of chronically enlarged glands in one groin was suspected of tuberculosis, suffered from recurring attacks of vaguely localized abdominal pain accompanied by severe vomiting. Repeated examination failed to disclose any abnormal physical signs, or to detect any abnormality in urine or blood count. The attacks came on at irregular intervals, and lasted from twenty-four hours to a week. After a particularly bad one which followed a " bumpy " aeroplane journey to Switzerland, he remembered that each previous one had been preceded by some particularly violent exertion. An excretion pyelogram revealed a small stone, of very slight opacity, lying in the right ureter 1½ inches above the bladder.

Relief of pain by emptying of a viscus, of the stomach by vomiting, and of the colon by the passage of wind, points to distension of its muscle coat as the cause, and demands an enquiry into the reason behind it. Alkalis relieve pyloro-spasm, not only that of ulcer, but the reflex spasm due to gall-stones or appendicitis.

CONCLUSIONS

Lastly, it must be remembered that the nerves of visceral sensation run their course along mesenteries and across ganglia, through the diaphragm and beside the thoracic vertebra, until they enter the cord to pursue further paths as yet undetermined. In each stage of this course they may be subjected to stimuli which are felt by the brain at their point of origin, much as a blow on the inner side of the elbow is felt in the little finger. The gastric crises of tabes, the colicky attacks that accompany tabes mesenterica, are reminders that pain of true visceral type may be extra-visceral in origin. Similarly the somatic nerves which supply the abdominal lining supply also its walls and the bones and joints of its framework, and pass on their way along the confines of the thorax. The errors which may arise from lesions of the anterior or posterior abdominal muscles, from diseases in the chest or spinal column or from extra-thecal tumours pressing on the posterior roots in the lower dorsal region, are familiar from books or even from bitter experience. But in the end the diagnosis will depend, not alone upon the collection and right interpretation of all possible facts, but upon the judicial shrewdness with which the facts are marshalled, the relative importance assigned to each, and the conclusions drawn. Such wisdom is not acquired from books, nor yet from discussions, but only at the bedside.

In the ultimate assessment of a case presenting abdominal pain as its main symptom, factors other than pain will influence the surgeon. Attacks of colic referred to the umbilicus, reappearing day after day but only lasting for a few minutes, unaccompanied by nausea or by recognized constipation, these indicate no more than that some part of the muscular tube supplied by the superior mesenteric artery is undergoing irregular and excessive contractions; here the age will provide, not a solution, but a clue which will point a line of investigation or of tentative treatment. In a child such attacks are most commonly due to enlarged mesenteric glands, less often to some congenital defect such as a Meckel's diverticulum ; in a man over fifty they suggest an early ring carcinoma of the pelvic colon. The illness of the patient, an indefinable complex which can only be assessed by the experienced eye, will often weigh in the surgeon's mind as much as the nature of the pain. I do not refer now to the cachexia of a malignant growth, though that only too often settles the diagnosis in a chronic case, but rather to the varying degrees of general impairment which are seen in the acute abdomen. A correct estimate of the condition of the patient will often settle the diagnosis in this most important type of case. In the differentiation between acute pancreatitis and impaction of a stone in an infected gall-bladder, always a difficult problem, the deciding factor is that, after the first hour the illness in comparison to the pain is far greater in pancreatitis than in gall-stones, and the discrepancy grows with every hour.

In patients with acute peritonitis the degree of illness is of inestimable importance, for the reaction of the peritoneum to an abnormal environment depends in part on the nature of that environment, in part on the suddenness of contact. The protective reflexes of tenderness and guarding indicate that the peritoneum is stimulated, but do not show how noxious that stimulus is; the appearance of the patient will go far to answer this second query. In a diffuse septic peritonitis of recent origin, such as that from a burst appendix, marked pain, tenderness and guarding over the affected area are found; the patient looks ill, but for some hours not desperately so. On the other hand, in pneumococcal peritonitis of similar duration, the pain and the local signs in the abdomen are less, but the general condition of the patient is one of profound intoxication. When blood is suddenly discharged into the peritoneal cavity, as it may be from a normal ovary, the pain which the patient feels over the affected area, and the tenderness and the guarding which the surgeon demonstrates, are occasionally as marked as they are in limited perforation of an ulcer: but the colour, the pulse, and the general appearance of well-being of the patient belie the local signs. In blood-borne post-operative peritonitis there may be no pain at all and only the slightest tenderness when the abdominal walls are palpated. Only a rising pulse and a disinclination to move in bed draw attention to the catastrophe, but the patient's appearance leaves no doubt as to its gravity. These distinctions are not merely of theoretical interest, but of vital importance. Expectancy is the attitude towards an obstructed gall-bladder, but free drainage offers the best hope of survival in acute pancreatitis. Immediate operation is necessary for a burst appendix, but in a girl whose menstrual period has gone astray it would be foolish, if harmless.

Reference

[1] Cope, Z.: *The Practitioner*, 1934, cxxxiii, 281.

THE NASAL ROUTE OF MEDICATION

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RECENTLY I gathered together in "The Leech" (June, 1936), the organ of the Students' Medical Council in this University, the results of my experiences relative to the common cold and influenzas, in the form of an article on "Nasal hygiene—a contribution to the prevention and control of nasal infection." Briefly expressed the burthen of the article was, in the first place, that the symptomatology of the common cold : the sneezing, blocked nostrils, running nose, tightness of the throat, roughened palate and irritating cough, formed various elements of a "syndrome of the sensitive area of the nose." Secondly that this "sensitive area of the nose" is chiefly the atrium of the middle meatus and the anterior end of the middle concha. The symptoms are in the nature of local and distance reflexes chiefly from this area, and apparently more particularly from the part supplied by the lateral nasal branch of the naso-ciliary nerve. Thirdly that the painting of this area by means of a spill of cotton wool (round the wooden end of a match) soaked in weak Mandl's paint allays the sensitiveness, immediately frees the nasal passages, removes the feelings of faucial constriction and destroys the cough, all of which arise reflexly through the trigeminal arc and the muscles connected therewith (tensor veli palatini supplied by the fifth nerve and the pharyngeal muscles supplied by the glossopharyngeal and vagus nerves). Fourthly that an alternating treatment of Mandl's paint and the direct instillation of a teaspoonful of a weak antiseptic such as 1 per cent. argyrol (or protargol or dilute hexyl-resorcinol) or of olive oil (or olive oil with 2 to 3 drops of eucalyptus oil or any other essential oil) or of almond oil into each nostril (the head being tilted backwards over the side of the bed—so that the weak antiseptic or oil flooded the infected nares and related sinuses) was adequate to prevent any cold from persisting for more than forty-eight to seventy-two hours.

PREVIOUS WORK

The purpose of the present note is to draw attention to a subject arising out of these procedures, the importance of which can scarcely be over-emphasized. Before that is discussed I disclaim once again any priority for the ideas put forward or the treatment advocated. In the first place the article by A. T. Todd on " A routine treatment of asthma " in *The Practitioner* (1933)[1], although unknown to me during the period of experimenting with various treatments, had already illustrated lucidly the zone supplied by the lateral nasal and anterior ethmoidal nerves as the receptor area for the cough and sneeze reflex. Todd had also pointed out that the same area had been recognized by Adam as the "asthmogenic zone," and by Hazeltine as the " trigger area " adding that " Dixon's experiments and clinical evidence point to the existence of this path " (through the vagal nerve for the muscular spasm of the bronchi and bronchioles). He then set out his routine treatment for asthma, which discards surgery and consists in packing the space between the middle turbinal and the septum (from the posterior choana to the anterior end of the turbinal) with a Dowling pack—a long tampon of long-fibre wool, soaked in 10 per cent. argyrol. With this treatment in 125 asthmatic cases he reported 28 per cent. cured, 63 per cent. improved, 5 per cent. unchanged and 4 per cent. worse after the treatment.

In the second place the article by E. P. Poulton and F. A. Knott on " The common cold, its prevention and cure " in the same journal[2], had already demonstrated the part played by oily substances in treating nasal infections, being based on ten years' advocacy of Glegg's treatment, consisting in applying massive doses of an inert substance to the mucous membrane of the nose and nasopharynx. The mixture consists of three parts of paraffinum liquidum and one part of paraffinum molle (white vaseline) flavoured slightly with rosettol. Menthol, gr. $\frac{1}{2}$ to the ounce, may be substituted for the rosettol.

PERSONAL EXPERIENCES

These independent confirmations of the procedures with weak antiseptics and oils, which I had been led to adopt and to advise with obvious benefit and no apparent harm to scores of people, encouraged me to pursue the general question of medication it opens up.

During the month of April, 1936, while in military camp for a fortnight I regularly instilled night by night a teaspoonful of olive oil into the sinuses of each nasal cavity. When the oil is allowed to run freely into the sinuses little if any of the oil escapes subsequently from the nasal orifice or into the throat. At first I was interested in the procedure purely from the point of view of maintaining the proper filtering action of the nose and the prevention of infections from arising in the untoward dusty atmosphere of the camp. Gradually, however, as the four-ounce bottle of olive oil dwindled at the rate of two teaspoonfuls a day, I realized that in fourteen days I had succeeded in assimilating over three ounces of olive oil through the nasal route (the bottle being nearly empty).

ANATOMICAL CONSIDERATIONS

This action of the nasal sinuses in absorbing lipoid substances into the body occurs presumably through the lymphatics, which drain posteriorly into the pharyngeal region and superiorly into the epidural and possibly subdural spaces of the endo-cranium. According to Bartels "Das Lymphgefass-system" in *Bardeleben's Handbuch der Anatomie des Menschen*, Key and Retzius found that the subdural space is connected with the lymphatic passages of the higher sense-organs and the connections between the nasal mucosa and the subdural space were displayed not only by Key and Retzius but also by Michel, Flatau, Cuneo and André (in man) and by Falconi (who established the existence of lymphatic connections between the frontal sinus and the pericerebral spaces). The ready flow of Prussian blue between the nasal mucosa and intracranial spaces along well-defined channels can be established in Ungulata by anyone who cares to inject the nasal mucosa of a fresh sheep's head, as has been done repeatedly in my department. Direct flow of materials absorbed from the nose into the endocranial areas is therefore highly probable.

The fundamental point at this stage is to recognize that, whatever the route of absorption, large quantities of fats and substances dissolved in fats can be directly assimilated through the lymphatic stream from the nasal passage and its neighbouring sinuses. The respiratory apparatus is developmentally a derivative of the digestive tract. The specialization of its lower moiety (trachea, bronchi and lungs) for the digestion, as it were, of oxygen from the air has obscured the fact that the upper moiety is far less differentiated and retains to an amazing degree its assimilative (or digestive) capacity for fluid materials such as oily mixtures. In consequence little, if any, experimental attention has been directed specifically to these assimilative properties of the upper respiratory tract.

ABSORPTION BY NASAL ROUTE

The only explicit information in this direction, of which I have knowledge, is contained in the papers by Blumgart[3], on " The anti-diuretic effect of pituitary extract applied intranasally in a case of diabetes insipidus " ; by Kritner and Greene[4] on " Administration of pituitary extract by nasal spray in the treatment of diabetes insipidus "; by Hofbauer and Hoerner[5] on " The nasal application of pituitary extract for the induction of labour", and by Pratt and Smeltzer[6] on " Nasal spray method of administering hormones of the ovary and pituitary glands."

Using a nasal spray, Blumgart showed that " Extract of the posterior lobe applied intranasally checked both the polyuria and polydypsia as effectively as hypodermic injections." Adapting the ordinary atomizer for the economic use of small amounts of pituitrin, by inserting a small test-tube in the atomizer bottle so that the suction tube of the atomizer nearly reaches the bottom of the test-tube, Kritner and Greene showed, that the nasal spray method of administration was practically as efficient as administration by hypodermic injection or by a nasal swab. Hofbauer induced labour by nasal administration of pituitary extract on cotton-wool swabs placed in the nostrils. As a result of their work first with mice and rats and later on in five illustrative clinical cases, Pratt and Merril state that—

> When the hormone has been sprayed into the nose, all of the material appears to be absorbed and there has been no sign or symptom of local irritation. The method of administration is so simple that the patients have no difficulty in managing it at home. . . . . The results obtained from our experimental and clinical tests indicate that the nasal spray administration of ovarian hormone, pituitrin, pitressin and pitocin is efficient, easy, and safe.

From these experiments it is known that watery as well as oily solutions are readily absorbed from the nasal mucosa and that the effects they produce are as measurable as those of substances introduced directly into the body tissues. This opens up an important new vista of nasal medication, which is virtually unexploited. The local treatment of nasal conditions can no longer be looked upon as merely local but are systemic as well. The effects of putting a pack of 10 per cent. argyrol, for example, into the nose cannot be assessed purely in terms of the local activity of the drug, but in terms also of the direct absorption of a relatively large quantity of the fluid directly into the lymphatic stream and its circulation throughout the entire body.

The significance of the absorptive capacity of the nasal mucosa is even greater when we come to consider the respiratory infections. Recently at a joint congress in Johannesburg of the Faculties of Veterinary Science at Onderstepoort and the Faculty of Medicine at Johannesburg, Dr. J. H. S. Gear reported that he had succeeded in producing lobar pneumonia by the instillation of pneumococcal cultures into the nostrils of mice, diffuse inflammations without consolidation by instilling streptococcal cultures, and a similar condition by instilling influenzal bacillary cultures. The direct introduction of organisms into the lungs in such experiments, though improbable, is not excluded, but equally the possibility of the lung conditions arising fundamentally from the absorption of toxin from the infected nasal area is not excluded. In all respiratory diseases the first barrier and therefore *the primary* *locus of the disease is the nares.* It is almost certain that in all respiratory conditions the initial factor in undermining the constitution and predisposing the lower moiety of the respiratory apparatus to attack is the collapse of the natural barrier in the upper moiety.

One of the outstanding characteristics of all respiratory infections from the common cold and influenza on the one hand to encephalitis lethargica and yellow fever on the other, is the rapidity and severity with which the nervous system is involved and the tediousness or total absence of its recovery when it has been affected. The concurrent evolution of the nasal apparatus and the " higher " portions of the central nervous system as a result of life on land is not to be overlooked in this connection. The recent work of F. A. Pickworth[7] on " Chronic nasal sinusitis and its relation to mental disorder " is therefore very opportune. By the injection of a diffusible dye into the nasal mucosa he too has shown how it spreads under the dura around the cavernous sinus and Gasserian ganglia along the sites of the blood sinuses, over the petrous temporal bones and the cribriform plate in man. The absorption of toxins may, as he says, be presumed to follow the same routes. In 471 consecutive post-mortem examinations upon mental hospital patients he found gross macroscopic evidence of infection of one or more nasal sinuses in 314 (or 66·6 per cent.). It is unnecessary to review the ground which has been so thoroughly and lucidly covered in that important communication. His work demonstrates that apart from lymphatic spread, septic spread often takes a direct course through bone and meningeal coverings into the brain tissue. When, through Pickworth's studies, the migrational capacity of bacteria into the brain tissue, whether through primarily existing lympathic connections or through routes secondarily opened up as a result of disease processes is realized, it is possible to visualize the directness of the relationship between infections of the upper moiety of the respiratory apparatus and the central nervous system. Both directly by spread into the epidural spaces and even into the pericerebral space (if the work of certain investigators is to be accepted), and indirectly by absorption into the lympathic stream and thence into the general circulation, the nervous system becomes bathed with the toxic products of bacterial growth in the nares. How great a quantity of toxic material can be absorbed via the nasal route is exhibited firstly by the rapidity and completeness with which hormones can be administered effectively by this route and secondly by the amount (two teaspoonfuls a day) of olive oil successfully administered without observable untoward effect for a fortnight in my own case.

CONCLUSIONS

These observations are far from exhausting this important topic. They are put together purely for the purpose of directing increasing inquiry in this direction. For generations the nares and sinuses have been treated with drops, sprays and inhalations of varying constitution, but there is little or no experimental physiological data concerning the mathematically-determined, absorptive capacity of the nares in man or any other animal for given substances whether nocuous, innocuous or useful. Yet such physiological and pharmacological knowledge is imperative not merely from the point of scientific accuracy in nasal medication itself. Since the primary locus of disease in respiratory infections is the nares and sinuses, and since toxic absorption from that primary locus is so rapid, the obvious corollary is that nasal medication should, and will, play a far greater part, than is usual at present, in their treatment. At any rate it is true to state that to-day it is not known what effect, if any, a thorough-going course of nasal treatment would have upon any respiratory disease. Similarly, if, as appears from the Birmingham Mental Hospital investigations, three out of every four mental patients have sphenoidal sinuses containing secretions which are charged with organisms instead of being sterile, there seems little doubt that adequate nasal treatment and a proper conception of nasal hygiene will play a part in the reduction or amelioration of insanity. Both respiratory and mental diseases therefore promise a new method of approach in respect of their treatment through a re-alignment of our attention to the upper respiratory area as the prime factor in many of their manifestations. To attack the nares in such cases may appear like trying to lock the stable door after the horse has been stolen, but the procedure may result in fewer losses in the aggregate of runaways; and, by directing attention where it should be directed, prevent the building-up of those terminal tragedies of acute and chronic respiratory and mental, to say nothing of systemic, ill-health which are so largely the heritage of nasal inadequacy in our social and industrialized communities.

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METHODS OF TREATMENT OF OBESITY

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DURING the present century a great deal of interest has been manifested in methods of maintaining bodily efficiency. The lay public and the medical profession have both begun to take a more scientific interest in the maintenance of a healthy normal body weight. This communication gives a brief summary of the methods which are used to combat obesity.

DIETETICS

The treatment of obesity by dietetics is fundamental and quite the most important method available. Without some control of the diet all other methods are likely to fail. In the more marked forms of endocrine disturbance results are difficult of attainment, but dietetics still remains the most important form of prophylaxis and therapy. The control of weight should begin at an early age; some writers believe that it should begin *in utero*, and there is no doubt that a disregard of the diet during pregnancy is harmful to mother and child. Marked obesity in childhood should certainly be corrected, particularly in children in whose families there is a history of diabetes. In this way obese children can be saved from much ridicule and encouraged to take proper exercise with their fellows.

There are very few contra-indications to treatment by means of dietetic control and only a few patients fall within the following list :

(1) Extreme old age. Treatment, if at all, should be applied with caution.
(2) Any form of acute disease, such as tonsillitis and rheumatic fever. If during dietetic treatment an infection intervenes or it is necessary to remove teeth or tonsils it is advisable to return to a more liberal diet.
(3) Any severe form of disease, such as grave anæmia of any kind. Severe

forms of cardiac or renal disease or gout should, of course, be treated dietetically at all times.

(4) Any intervention of symptoms such as fainting, nervousness, weakness or irritability. The treatment should be interrupted for a short period. Actually these emergencies rarely arise.

A medical examination should always be carried out and medical supervision should be insisted on throughout the entire treatment, and, if possible, for some time afterwards so that the patient may be kept at the optimum weight. Much harm is often done by lay supervision, but if scientific standards are used in the selection of a diet untoward symptoms are rare and slight.

The scientific principles are briefly as follows:

(1) *Carbohydrates.*—Restriction, more especially of the concentrated forms such as sugar, bread, potatoes, beer and ginger beer.

(2) *Fats.*—Restriction especially of those, such as lard and olive oil, which do not contain vitamins.

(3) *Proteins.*—Very little restriction.

(4) *Roughage.*—A generous supply of vegetables and fruit to provide bulk and to satisfy hunger.

(5) *Vitamins.*—An adequate supply by vegetables, fruit, eggs, milk and butter.

(6) *Minerals.*—Adequate supply by salads and milk. Table salt should be restricted to that used in cooking.

(7) *Fluids.*—No restriction. These may be taken as water, weak tea or coffee. Fluids tend to relieve slight hunger and to correct constipation. Both salts and fluids may, however, be contra-indicated by other conditions, such as cardiovascular renal disease.

(8) *Size of meals.*—Meals should be bulky to prevent hunger; concentrated food should not be given. Salads and vegetables are excellent. Foods should be given in the most satisfying form, thus hard-boiled eggs are more satisfying than lightly cooked ones, and hard food, such as apples, which requires chewing, has a higher satiety value than soft food, such as bananas. Clear soups and meat extracts have very little food value, but are useful in " taking the edge off" the appetite.

(9) *Number of meals.*—Three or four meals may be taken in

the day but nothing should be eaten between meals. If, however, the patient feels hungry in the mid-morning or at bedtime he may take a cup of marmite or bovril, or perhaps extra fruit.

It is essential that the diet should be as normal in composition as possible in order that other members of a patient's household may be subjected to the minimum inconvenience. A very satisfactory diet of 1,000 calories is given here. It must be emphasized that this should serve only as a guide and should be adjusted for each individual patient. Many patients have remarked that this diet contains much more than they usually eat.

STANDARD DIET SUITABLE FOR CONTROL OF UNCOMPLICATED OBESITY

	Grammes of			
Breakfast	Carbohy.	Prot.	Fat	Calories
Tea with 2½ oz. milk (5 tablespoons)	4	2½	3	53
1 egg	—	6	5	69
1 rasher bacon	—	5	15	155
2 unsweetened biscuits	12	—	—	48
Butter ¼ oz. (size of half walnut)	—	—	6	54
Dinner				
Meat 2½ oz. (large portion)	—	25	5	145
Green vegetables, a large portion	5	—	—	20
1 unsweetened biscuit	6	—	—	24
1 orange, apple or pear	10	—	—	40
Tea with 1 oz. milk	2	1	1	21
Tea				
Tea with 2½ oz. milk	4	2½	3	53
2 unsweetened biscuits	12	—	—	48
Butter ¼ oz. (size of half walnut)	—	—	6	54
Tomato with little cress or lettuce	1	—	—	4
Supper				
Meat or cheese 2 oz. (fair portion) or fish 6 oz. (large portion).	—	20	4	116
Salad, lettuce, cucumber, tomato, etc. or 1 portion of fruit.	5	—	—	20
1 unsweetened biscuit	6	—	—	24
Butter one quarter oz. (size of half walnut)	—	—	6	54
	67	62	54	1,002

The above diet gives 1,002 calories and contains 67 gm. of carbohydrate, 62 gm. of protein and 54 gm. of fat. Each gm. of carbohydrate or protein gives 4 calories and each gm. of fat yields 9 calories.

NOTES ON THE ABOVE DIET

Breakfast.—The egg may be poached, boiled, scrambled with some of the milk and butter supplied with the breakfast, or may be served as an omelette. It should not be fried. The bacon should be cooked until crisp. Instead of the bacon another egg may be added to the meal, or, as a further alternative, four ounces of any white fish may be substituted for the bacon and egg. The fish may be steamed, boiled or baked in some of the milk and butter but should not be fried.

Dinner.—Under the term meat is included poultry, rabbit, heart, brain, sweetbread, kidney and liver, and this part of the diet may be grilled, roasted or boiled. If preferred a vegetable dish such as " cauliflower cheese " may be prepared from the vegetable and cheese allowance. The vegetables may be eaten raw as a salad. The fruit may also be eaten uncooked when it will be found to be more satisfying, or it may be stewed or baked and sweetened with saccharin.

Tea.—Marmite or bovril may be spread on the biscuits.

Supper.—The meat may be minced and served as a mould; the cheese may be used to make a " rarebit " which can be served on the biscuit; or if all the allowance of milk and egg has not been taken earlier in the day fish can be served as fish custard.

It will be noticed that the diet contains no bread and we believe this is to be a matter of no small importance. Crispbread or any unsweetened biscuits may be substituted for bread. In these circumstances the patients can be questioned as to whether or not they have had any bread at all and there can be no possible doubt in their minds as to the accuracy of their answer. On the other hand, when bread is a part of the diet it is easy for the allowance to be exceeded, and this extra bread, besides having a high caloric value itself, serves as a medium by which butter, jam, marmalade and honey may be taken. After the first few pounds are lost and the patient is convinced of the effectiveness and benefit of the treatment, bread can be returned to the diet in small quantities.

The diet for children is similar to the above but should contain at least one pint of milk daily. This may be given as junket, sweetened with saccharin and flavoured with vanilla, almond or coffee, or combined with the egg of the diet to make a custard. Protein should not be restricted and care should be taken to ensure that at least half of it is first class, that is, from milk, cheese, eggs, meat or fish. With the great majority of children all that is necessary for successful treatment is to restrict chocolates and other similar carbohydrate-containing foods.

EXERCISE

Another fundamental method of attacking obesity is by the inauguration of proper exercise. Many obese patients, for reasons of drowsiness, laziness or fear of ridicule, take the minimum of exercise. This has been noticeable when women, especially, although enjoying swimming, have refrained from this pastime because of the fear of attracting attention. Patients must be encouraged to increase their activity gradually, and dancing, swimming, walking and golf are particularly to be recommended. Douthwaite[1] has recently stressed the great value of the " Culture of the Abdomen," and there is no doubt that exercises for this purpose are of the greatest value. As more exercise is taken patients often begin to discard excess clothing which tends to restrict their movements, and this also has a beneficial effect on their health.

GLANDULAR THERAPY

Glandular therapy is often used in conjunction with dietetics and exercise and usually fails unless these are carefully controlled. Unlike diet and exercise, glandular therapy is not without considerable danger. Accurate knowledge of the kinds of products to use and their dosage are not available. Even with the best known of the products, thyroid extract, there is no little danger. If the physician decides to use this preparation he should take adequate steps to control the dosage and to minimize the possibility of untoward effects by regular determinations of the pulse rate, pulse pressure and basal metabolic rate. There is no doubt that thyroid medication often causes addiction and predisposes a patient to thyrotoxicosis and auricular fibrillation. The remarks about thyroid extract, which is a drug with an immense amount of clinical experience to support its use, and capable of comparatively accurate assay, apply all the more strongly to other glandular products, the properties of which are not so well known. These should only be used with the greatest care. Several proprietary medicines for reducing weight contain thyroid extract as their active principle and often prove dangerous because the medical adviser and patient are unaware of this fact. Fortunately, however, the chief constituent of most of these remedies is the common seaweed, bladderwrack, which is practically inert.

DRUGS

Perhaps the best-known drugs used in weight reduction are the nitrophenols and related substances. The effects of these substances were first observed during the Great War, when the poisonous properties of dinitrophenol caused grave concern to the French authorities. This chemical occurred as an intermediate product in the manufacture of certain nitro-explosives, and it was thought, at one time, that the production of this type of explosive would have to be abandoned on account of the alarming symptoms of poisoning among the munition workers. Extensive investigations into the pharmacological properties of dinitrophenol were carried out at that time and these investigations have been extended more recently by Cutting, Mehrtens and Tainter, who found that dinitrophenol could apparently be administered to animals and man over prolonged periods with no ill-effects whatsoever provided the doses were moderate. On such a dosage the pulse and respiration rates were not increased, but cellular metabolism was much accelerated, and this caused satisfactory weight reduction of obese patients. More recent work has shown, however, that the administration of the drug is not without considerable danger, and it should therefore be used with the greatest caution and only by those fully aware of its dangers.

SURGERY

Occasionally surgery is necessary for the removal of fatty tumours, and the surgical removal of adipose tissue in the abdominal region is sometimes undertaken. The injury to the tissues in the latter case is such that the adiposity generally does not recur in the same region, but this method of treatment is illogical and would certainly command no widespread approval.

PHYSIOTHERAPY

Physiotherapy is a useful adjunct to the treatment of many diseases and obesity is no exception. A masseuse sees the patient at relatively short intervals and can do a great deal to stimulate and maintain interest in all forms of treatment. In this way she is extremely valuable, but there is a considerable amount of truth in the statement that the only person who loses weight by massage is the masseuse.

OTHER METHODS

Treatments involving Turkish baths, mud baths, diuretics (generally those containing mercury), and purging, are often recommended, but they should only be employed under medical supervision. In general, they are more suitable for patients suffering from cardiovascular-renal disease than for cases of obesity. However, many authorities believe that a small proportion of patients suffer from a " water-salt-retention" form of obesity which is probably related to pituitary-cerebral dysfunction, and such persons benefit from the above procedures.

RESULTS

The results of treatment depend a great deal on the education of the patient and the personality of the practitioner. The dangers of obesity should be carefully explained and the rationale of the therapeutic measures also given consideration. With well-educated patients this is almost all that is necessary to obtain active co-operation. The patient and the physician must both believe in the advantages of the treatment. It is sometimes possible to arrange for patients who have felt the benefit of loss of weight to call at the same time as new candidates. Something of a club can be formed where patients compare notes in the waiting-room. The loss of the first three to five pounds is most important, and patients are often so surprised by this loss that their co-operation is assured. Almost invariably they begin to feel better in health after a reduction in weight of only a few pounds. They suffer less from pains in their joints and so feel inclined to take exercise and this is of additional benefit. They negotiate stairs more easily and pause for breath less frequently. The weight is generally lost from all adipose regions with great improvement to the figure and facial features. Often a gratifying fall in blood pressure, both systolic and diastolic, results. Abnormalities of menstruation may disappear, and in many cases rashes and other vasomotor disturbances are partially or completely relieved.

All these changes should be carefully observed by the practitioner, and if the patient comes regularly for weighing the making of these observations is facilitated. A balance accurate to an ounce is a great asset, and patients should call at the same hour on each visit, because the weight of an individual varies by three or even more pounds during the day. Most patients lose two pounds per week while continuing their ordinary work, and if more than this is lost the diet should be adjusted to a slightly higher level. One of the most striking effects to be noticed in a large clinic, observed over a length of time, is the change of mentality associated with a loss of excess weight. Almost without exception a great improvement is apparent. Patients become more active and interested in their work, their friends, and also in their appearance. Ambition is stimulated and it has been noticed that a woman of 17 stone who was content to remain at home, sleeping most of the time, began to look for work at 14 stone, secured it at 13 stone, and at 12 stone was too busy, working overtime, to return to the clinic. The mental change is, perhaps, the most important aspect of the treatment.

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GENERAL PRACTICE

VII—THE FIRST SIX MONTHS

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THE first half-year of general practice may be a period of intense activity associated with a series of new experiences or, on the other hand, it may be a dismal stretch of never-ending time. In short, this section of existence can be approached with equanimity by the tyro about to join a partnership, but for the "squatter" anxiety as to the future overshadows all else.

CALLING ON COLLEAGUES

A practitioner settling in the district of his choice, whether in partnership or not, should invariably call on the doctors practising in his vicinity. This is an act of elementary courtesy to professional brethren which unfortunately is less often observed now than in pre-war days. Quite apart from its being a gesture of goodwill it has the advantage of immediately quenching any misgivings which the established practitioners may have when they hear of a new arrival to the district. There is no reason why the most intense competition should not exist between doctors in conjunction with complete friendliness. If the courtesy calls are not made, the new arrival thereby pronounces himself as a potential cut-throat competitor and starts practice at the great disadvantage of lacking the fellowship of others in the town. It is true that the process is time-consuming and may have to be distributed over several months. However, it is well worth while and will establish respect. If the doctor on whom a call is made is out, it is necessary only to leave a card. Each practitioner who is visited will of course return the call as soon as he is able. Occasionally the reception meted out to the visitant is cavalier, but this is quite exceptional.

As a doctor's wife usually forms an integral part of general practice it may not be out of place to refer to one of her onerous duties, namely, returning visits. It is for her to await the calls of those ladies who may visit her and she may be faced with the task of returning some hundred or more calls. As these must be made in the afternoon she is not likely to escape as lightly as her husband, and she will probably be involved in eighty or more tea parties during which she will be subjected to that degree of critical scrutiny which is carried to such a fine art by the feminine sex. Illogically the opinions of the new doctor may be based largely on the impression given by his wife. Finally, he also will be involved to some extent in social calls when he will meet with receptions which may be friendly, irritatingly patronizing, or even antagonistic. It is particularly on these occasions that care should be exercised to avoid making chance remarks which might be misconstrued as savouring of self-advertisement. That there are individuals in the profession who deliberately exploit all social occasions for their own ends is unfortunately only too true. To be mistaken for one of these as the result of some chance remark is damaging for self-laudatory tactics are a fairly certain indication of abysmal ignorance.

Attendance at branch meetings of the British Medical Association is always advisable, at any rate during the first few months in practice. If the local organization provides interesting discussions of medical subjects it should obviously be supported in the future. Here and there meetings may be poorly attended, devoted chiefly to medico-political considerations and generally presenting an air of lassitude and decay. This is symptomatic of jealousy as opposed to the spirit of healthy competition in the neighbourhood. No one individual can cure the disease, so the meetings are best left alone.

SETTLING IN

For the squatter the process of settling in is prolonged, wearisome and often fraught with disappointment. Sitting and waiting for the chance arrival of a patient requires the tenacity and optimism which often bring success in the long run. The doctor must always be within call, for a single patient may be the means of opening up a large field of practice. The first six months of a partnership practice are very difficult in that work of one kind or another never ceases. Probably the first three or four months will precede the final entry into the partnership. This time will be spent in accompanying the outgoing doctor on his rounds and in being introduced to those of his patients who are willing at least to have a look at the new arrival. He is very much on probation, being under the scrutiny not only of prospective patients but also of the prospective partners. The receptions meted out at patients' houses leave nothing to be desired so far as diversity is concerned. Often there is an atmosphere of frigid politeness enveloping an ill-concealed decision to have nothing to do with the new partner once the old is out of the way. Usually there is kindness and consideration for the difficulties inherent in these meetings. The patient's natural loyalty to his doctor forbids too hearty a welcome to the new arrival, but sufficient warmth is given to the reception to make it clear that at any rate he will be given a trial run. In point of fact, with a good introduction the major part of the practice will remain with the incoming man. It is questionable, however, if this remark is applicable to Mayfair and its immediate surroundings. As time goes on more and more visits will be passed to the newcomer so that by the time the outgoing partner leaves, the transference will be almost complete. An apparently heavy falling off of patients at this juncture is due to the fact that many patients have regular visits from their practitioner which are not absolutely necessary. A new man is called upon for necessity only, but will gradually assume his predecessor's position.

What with introductions, independent practice and professional calls the first six months will be found to be fatiguing, in fact more so than later when the practice is running on the oiled wheels of habit.

Loyalty to the doctor whose place is being taken should always be maintained. It is obvious that on many points the newcomer's opinion will differ from that of the outgoer, but nothing is gained by making this apparent. The acquisition of patients and their goodwill must be a gradual process. In the meanwhile the late practitioner will often be quoted as having advised this or that which may be at variance with the new practitioner's wishes. It may be galling but quite understandable, and is after all an earnest of the loyalty which the patient will transfer to the new man in due course. The other partners will naturally pass over various emergency calls which they cannot deal with themselves, also a certain number of the less desirable patients who may be a constant source of worry and irritation, a percentage of night calls and so far as possible all new patients. All this must be accepted as part of the day's or night's work. When a thoroughly good practice has been established around the new partner he is then entitled to refuse extra work offered to him purely as a convenience to a senior colleague. For the man recently arrived from doing house jobs at hospital there is great opportunity for increasing the partnership's takings by carrying out laboratory investigations. Blood counts, test meals, microscopy of urine, blood-sugar estimations and so forth may be easy to him and yet of great clinical and financial value.

THE VISITING ROUND

When planning a round it is essential to work in some orderly scheme. So far as possible both morning and afternoon rounds should be based on a rough circle. This not only avoids wastage of time due to retracing a path, but also minimizes the necessity of reversing the car. Naturally the circle will have some bends and twists in consideration for urgent cases or for consultations with other doctors. For the latter punctuality is all essential even if it wrecks the planned round. Adequate equipment should be carried in the car to meet all probable needs. A call may mean a paracentesis or syringing an ear, and to have to motor back several miles for an ear syringe is aggravating, for the patient cannot be expected to pay for two visits. Every list is liable to criticism, but the following will meet most requirements :

Stethoscope, sphygmomanometer, jerk hammer, ophthalmoscope, thermometer, instruments for examination of throat, nose and ear, hypodermic syringe and needles, antiseptics, morphine, adrenaline, atropine, purgatives, amyl nitrite, mild analgesics, hypnotics, wool, finger cots, throat swab, oxalate " venule " and two glass microscope slides. A separate surgical bag will be found useful to contain sutures, needles, scalpels, forceps, antiseptics, wool, gauze, bandages, local anæsthetics, catheters, chloroform, stomach pump, ear syringe, lubricants, venesection needles and enema syringe. A separate midwifery bag should always be kept fully equipped.

Doctors have a reputation for unpunctuality for which they are not always to blame. On the other hand, it does with some people become an unnecessary habit. A tendency to go on and on and arrive home late for meals and so forth is extremely bad for the health of the practitioner. The high incidence of duodenal ulcer in our profession is a tribute to this. In point of fact, it is usually quite possible to eat at fixed hours and the habit should be assiduously cultivated.

CONSULTATIONS AT HOME

Certain times for consultations at the doctor's house are arranged according to the needs of the district. The trouble is that he never knows how many people are likely to turn up. When the visiting list is at its longest, the waiting room is likewise packed. It is here that the doctor develops his power of deciding in a few minutes whether the complaint is trivial or serious. A complete overhaul of each patient is quite impossible. Whatever symptoms suggest its desirability, it is far better to ask the patient to go home to bed at a certain hour and then visit him. The saving of time is worth it. Notes should be taken of every case : it is the only possible way of running a practice efficiently, although at times the writing up of the day's work is the last straw added to the camel's back. A shorthand typist engaged for an hour each evening reduces the labour enormously and, incidentally, keeps the practitioner up to scratch. The entire dictation seldom occupies more than fifteen minutes. The demand for dietetic restriction in one or other direction is constantly growing. The patient remembers in detail what the doctor has forbidden, but he, on the other hand, cannot possibly bear in mind all the do's and don'ts he has laid down unless he has notes to aid his memory.

Of the host of other small points which have to be learnt the most important relate to prescriptions. How many men on leaving hospital know which drugs are expensive and which are cheap ? The information is much more valuable than a knowledge of how to roll a pill. Prescription writing is an art to be acquired as soon as possible. Hospital training debars this by virtue of the current and unavoidable practice of using stock mixtures. Fortunately the dispensing chemist is finally responsible and will ring the doctor to inform him if he has transgressed the laws of compatibility. The task of prescription writing is still further complicated by the steady extension of the Dangerous Drugs Act and Poisons Schedule. A maternal government, anxious to preserve the lives of the weak-willed, has added greatly to the labours of doctors, dentists, and chemists in order to achieve its goal. Manufacturers of cocaine have waxed wealthy on its enhanced price.

RELATIONSHIP TO FELLOW PRACTITIONERS, CONSULTANTS, NURSES AND NURSING HOMES

In the earlier part of this article reference has been made to the desirability of making friendly contact with fellow practitioners. Sooner or later patients will ask for a consultation between the doctor and a member of another partnership. This should not be taken as evidence of lack of confidence in one's ability. The same remark applies to the demand for a consultant. More often than not the step is taken on account of pressure from relatives, or for other reasons which it may be undesirable to reveal. The man who takes umbrage at the request for a second opinion is invariably he who has reason to doubt his own ability. Nurses can be and usually are the greatest and most loyal supporters of the men for whom they work. There are others whose tongues run away with them. Anxious to display their knowledge, they criticize the doctor to the patient and sow the seeds of disaffection. At the first sign of such happenings the nurse must be discharged or alternatively the patient passed over to a colleague.

Many nursing homes are a disgrace to our country. The best side is always shown to the doctor. Complaints from the patient are too often attributed to a fault-finding temperament when in fact they may be well-founded. To assess a nursing home the practitioner should call every now and then at meal time to observe the fare for himself. Furthermore, the patient should at one time or another be seen without the presence of matron or sister. Identical complaints coming from two or more patients are almost certainly well-founded.

CASE REPORTS AND CLINICAL NOTES

TWO CASES OF ACUTE HÆMORRHAGIC PANCREATITIS WITH RECOVERY FOLLOWING OPERATION

By GEORGE MITCHELL, M.B., Ch.B.

Two cases of acute hæmorrhagic pancreatitis were followed by recovery. In both cases the patients gave a history for some time previously suggesting the presence of gall-stones.

Case 1.—Mrs. M, aged 42, had suffered for several years from attacks of flatulent dyspepsia and two years previously she had what seemed to be an attack of gall-stone colic, but at that date she refused operation. During the subsequent two years she continued to suffer from flatulent dyspepsia and had several minor attacks of upper abdominal colic. When seen at 9 a.m. on April 23, 1933, she gave the history of sudden onset at 8 a.m. of epigastric pain passing to the back and accompanied by retching with vomiting, the vomit containing bile. The pulse was 80 and temperature 98·6° F. The cheeks and lips were livid but the face was otherwise pale. She was collapsed and abdominal examination revealed slight deep-seated epigastric tenderness with no definite rigidity. The bowels moved freely in response to an enema. In view of the history and the abdominal condition operation was deferred, the symptoms being regarded as due to gall-stone colic. She received a hypodermic injection of morphine, $\frac{1}{4}$ grain, but it brought little relief. Early in the afternoon of the same day, on account of the symptoms not being relieved and also as the local abdominal signs appeared somewhat indefinite, she received an injection of morphine $\frac{1}{6}$ grain. In spite of the continued pain she was able to turn and lie prone on the edge of the bed and retch, quite unlike a case of perforation of a viscus. In the evening of the same day her condition was no better and she showed definite rigidity over the left costo-abdominal region. By this time the pulse had risen to 104 and the temperature was 99·8° F.

While at first I concluded she suffered from gall-stone colic I now regarded her condition as being due to acute pancreatitis and decided to operate. The abdomen was opened by a right paracentral incision. Fluid containing fat globules was present in the abdomen and the gall-bladder, though it contained calculi, showed no evidence of recent inflammation. The omentum and abdominal fat showed extensive fat-necrosis. The lesser sac was opened via the gastro-colic omentum. Blood-stained fluid with fat globules was found and the pancreas was enlarged and purple with numerous hæmorrhagic areas. The gland was punctured at several points with an artery forceps and a large tube inserted down to it. Over 200 gall-stones were removed from the gall-bladder, which was drained. The patient had a stormy convalescence and ran a temperature of 100° F. to 103° F. for several weeks. The upper part of the abdominal wound broke down and exuded large necrotic masses. A large abscess developed in the left abdomen, which was opened under local anæsthesia on April 22. Subsequently her condition improved considerably, but the pulse rate and temperature remained unsatisfactory. A second residual abscess was opened in the right iliac fossa on May 9, after which she showed decided improvement, though the pulse and temperature did not fall to normal till early in June. A fæcal fistula developed in the left abdominal wound but healed after a few weeks.

She was discharged from hospital early in August after all the wounds were healed. For several weeks following the primary operation her urine contained a small amount of sugar, during which period she received insulin. She is now in excellent health and free from all symptoms of dyspepsia. Her urine is sugar-free.

The facts which appear of note in this case are first, the extreme abdominal pain with, in the early stage, lack of appreciable abdominal rigidity, a feature of some cases of acute pancreatitis in its early stage; and second, the comparative ease with which the patient could raise herself and lie prone on the edge of the bed while she was sick. It would not be expected that a patient suffering from such a condition could do this.

Case 2.—G. M., aged 49, gave a history of flatulent dyspepsia extending over a period of about twenty years, but he also described "indigestion attacks" of the duodenal ulcer type. He had no history of a typical gall-stone colic, but about ten years previously had suffered from what was regarded as catarrhal jaundice. When seen on November 8, 1933, he gave a history of moderate epigastric pain commencing about 9 a.m., followed in an hour's time by severe, agonizing pain accompanied by retching, but he did not vomit. He felt the pain to some extent in the back. When seen at 10.30 a.m. he was suffering from severe epigastric pain. He showed definite collapse with pinched features. The face was pale and the lips slightly cyanosed. The pulse was 90 and of small volume, the temperature was subnormal. The abdomen, which showed no evidence of distension, was fixed and there was intense tenderness accompanied by extreme rigidity in the epigastrium. The condition appeared to be due to a perforated duodenal ulcer and I decided to operate at once.

On opening the abdomen by a right paracentral incision, clear fluid was found in the upper right quadrant, but it did not contain fat globules. Dense adhesions were found in the region of the gall-bladder, pylorus and duodenum. The omentum showed only a few small necrotic patches, and the gall-bladder, though not inflamed, was found to contain calculi. On opening the smaller sac, through the gastro-colic omentum it was found to contain blood-stained fluid with fat globules. The pancreas was enlarged and purple and presented several hæmorrhagic patches. It was punctured at several points and a large drainage tube was inserted down to it. The gall-bladder was drained after the removal of 223 calculi. He made a very good recovery and was discharged from hospital on May 6, 1934. He is now in excellent health and entirely free from any dyspeptic symptoms. Sugar was not present in the urine during recovery.

It is perhaps of note, that, while case 1 showed little or no rigidity of the abdomen during the first hours of illness, case 2 had well-marked abdominal rigidity from the onset of illness. The early recovery, without complications, in case 2 was probably accounted for by the fact that, owing to the more definite local abdominal signs, he was subjected to operation at a much earlier stage of illness.

A NOTE ON THE TREATMENT OF STERILITY

By J. HIRSCHMANN, M.A., M.B.

During the past five years eighteen cases of apparent sterility in young married women have come under my notice. In each case marriage had been from two to five years and there was no history of any pregnancy. Each patient complained of painful menstruation in some degree. On bimanual examination I found no abnormality of any kind except a small conical cervix; therefore the sterility which ensued was not, in my opinion, caused by any gross malformation. In all these cases coitus was not satisfactory from the woman's point of view.

In each of these cases I inserted a Smith-Hodge pessary which I removed and cleaned after four weeks. In twelve of these cases pregnancy was established after one insertion of the pessary. Of the other six, five became pregnant within three months, while the last one had previously been twice curetted and dilated and she is still sterile.

In my opinion the method by which this mechanical device helps the pregnancy is by creating a small depression just before the cervix thus forming a receptacle in which the semen is deposited close to the os uteri. In the ordinary course of events the semen would probably run out of the vagina before it had much chance of connecting with the cervix.

In view of the number of young women who are yearly curetted for apparent sterility, I think the above method is of interest and worth a trial.

PRACTICAL NOTES

THE TREATMENT OF PARASITIC SKIN INFECTIONS

Pointing out that the parasitic group of diseases forms a not inconsiderable percentage of the total number of cases seen in dermatology, F. Wise and J. Wolf (*Journal of the American Medical Association*, October 3, 1936, cvii, 1126) discuss the correct forms of medicaments which should be employed. For ringworm infections of the feet they list eleven " time-tried, time-honoured and most useful remedies " with the remark that these stand high in the list of eczematogenous substances. A useful adjuvant to these active medicaments in all cases is the hot potassium permanganate solution foot-bath, with about 10 grains to the basin of hot water, the feet being soaked for one-half hour daily. For the prophylaxis of this type of ringworm it is recommended that half to one per cent. solutions of sodium hypochlorite should be available in all adequately equipped gymnasiums, clubs and schools. For tinea cruris the most pleasant treatment is said to be the application of the following painted with a brush, night and morning :—

℞	Resorcinol - - - - - - - -	75 grains
	Calamine - - - - - - - -	250 grains
	Zinc oxide - - - - - - - -	400 grains
	Glycerin - - - - - - - - -	180 minims
	Lime water - - - - - - - -	½ ounce
	Rose water - - - - - - - -	to 4 ounces.

For monilia infections of moist folds of the skin it is recommended that steps to reduce the usually associated obesity must always be part of treatment, and wet dressings with ¼ per cent. silver nitrate solution for twenty-four to forty-eight hours followed by the use of the resorcinol lotion mentioned above will often be sufficient to effect a cure. For the similar type of infection occurring as fissures at the corners of the mouth (perlèche) the following is recommended :—

℞	Ammoniated mercury - - - - - -	45 grains
	Salicylic acid - - - - - - - -	30 grains
	Wool fat - - - - - - - - -	75 grains
	Soft paraffin - - - - - - - -	to 2 ounces.

(The prescriptions have been adapted to British usage.)

THE TREATMENT OF EPILEPSY

According to C. Adler (*Presse médicale*, October 14, 1936, xliv, 1607) the rational treatment of idiopathic epilepsy consists in the use of barbiturates combined with caffeine so as to secure the specific sedative effect of the one drug while abolishing any depressive action on such parts of the nervous system where this might prove dangerous.

He employs a scheme of dosage of phenolbarbitone, with or without methyl-phenolbarbitone, in an average dosage of 1/6 to 1/2 grain for a child, 1/4 to 1 grain for an adult with symptoms of medium severity and 1 to 2 grains if the symptoms are more severe, never exceeding a maximum in the most refractory cases of 2½ grains per dose. The caffeine is given in three doses daily aiming at a total for the day which is approximately one-half that of the barbiturates. The treatment is always begun with a dose of both drugs smaller than the averages already mentioned and given three or four times daily as far as possible so as to anticipate the occurrence of the epileptic seizures by a period of 5 to 6 hours. The dose is gradually increased and, if the fits can be controlled, after a period which varies from 8 to 15 months, according to the severity of the disease, a gradual reduction in the dosage is then undertaken. From a large series of cases, the modest claim is made that a complete inhibition of symptoms has been obtained in 12 per cent. of patients.

THE RELIEF OF PAIN IN BILIARY DISORDERS

An investigation into the influence of certain drugs in relation to biliary pain carried out on patients who were undergoing drainage from the common bile-duct, has led to certain conclusions which have an important practical application. W. L. Butch, J. M. McGowan and W. Walters (*Surgery, Gynecology and Obstetrics*, October 1936, lxiii, 451) have studied particularly the effect on the intrabiliary pressure of the subcutaneous injection of various drugs and it was found that morphine, codeine and dilaudid all produce marked increase of pressure within the common bile-duct as a result of inducing a spasm in the sphincter at the lower end of the duct. The effect of morphine is apparently a prolonged one and concurrent with the rise in intrabiliary pressure the patient may experience an attack of severe pain. On the other hand amyl nitrite and glyceryl trinitrate produce a relaxation of the sphincter, producing a fall in the intrabiliary pressure. X-ray examinations showed that following the administration of amyl nitrite there was prompt emptying of the hepatic and common bile ducts. The observations apply only to patients who have undergone cholecystectomy, but they have an important bearing on the correct selection of drugs for all forms of biliary pain. Other drugs used, such as caffeine, luminal, and ergotamine were without any effect upon intrabiliary pressure.

X-RAY TREATMENT OF CARBUNCLE

Although first suggested thirty years ago and adopted in certain centres, the X-ray treatment of carbuncle has not received a general application and is not as widely known as it deserves to be. C. K. Hsieh, C. P. Chang and H. L. Chang (*Chinese Medical Journal*, September 1936, l, 1217) review the literature and analyse their own series of thirty-nine patients in twenty-five of whom the results of treatment are known. It is pointed out that there is no standard technique, but the general principle has been to use small doses at frequent intervals over a field large enough to cover the infected area and a zone of about one inch of normal tissue beyond the periphery of the lesion. The treatment may be combined, if necessary, with simple incision to drain local abscesses and it has been particularly favourable in three patients in whom the carbuncle was a complication of diabetes mellitus. In twenty-two out of the twenty-five cases in whom the results were known, these were favourable and three who did not respond were all most severe with bacteriæmia. It is thought that the effects of the X-rays are to produce stimulation of the local bodily defence mechanism rather than any direct bactericidal effect.

THE USE OF BENZEDRINE

Further studies on benzedrine, a synthetic preparation of the ephedrine and adrenaline group, have now been made in various centres and according to A. Myerson, J. Loman and W. Dameshek (*American Journal of the Medical Sciences*, October 1936, cxcii, 560) the main effect is a central stimulating one, the reaction being prolonged for several hours. The drug has a striking and prolonged effect in raising the blood pressure with a less marked effect on the spinal fluid pressure. There are also effects upon smooth muscle. Its practical use in various clinical conditions is summed up by these authors; they include its ability to arouse narcoleptics and confirm its stimulating effect on psycho-neurosis and in mental and fatigued states which has been described before. Because of its ability to raise and maintain arterial pressure over a period of several hours, its use in counteracting an expected fall in blood pressure, as, for example, during anæsthesia or in raising the blood pressure in conditions of peripheral circulatory failure, as in shock or pneumonia, is suggested. Its use in diminishing increased tonus in organs made up in great part of smooth muscle—such as the gastro-intestinal tract, the ureter, and gall-bladder, seems to be definitely indicated. It should not be used, however, in patients known to have high blood-pressure or severe vascular or cardiac disease.

BASAL ANÆSTHESIA FOR CHILDREN

Urging that basal anæsthesia, unless definitely contra-indicated, should be available for all children, H. E. Coe (*Canadian Medical Association Journal*, October 1936, xxxv, 390) summarizes the best methods available. His experience has been such as to make him enthusiastic, and there have been no occasions for anxiety other than post-anæsthetic excitement in a few cases and some slight respiratory depression when avertin was given too quickly. He suggests that for rectal use avertin should be preferred to paraldehyde and for intravenous use, the barbiturates most frequently used are sodium amytal, pentothal and evipan. The question of dosage is naturally most important, but generally speaking healthy infants and young children tolerate full doses for their weight as well as older children and adults.

THE TREATMENT OF GOUT

SUGGESTING that gout is still more prevalent than is generally supposed, A. Cohen (*American Journal of the Medical Sciences*, October 1936, cxcii, 488) sums up his experiences with over forty of his patients suffering from this disorder during the past five years. He has found that during the acute attack, rest in bed, hot applications of saturated magnesium sulphate solution applied to the affected part, colchicum and a purine-free diet are of chief benefit. During the period of convalescence, the patient is put on to colchicine (B.P.C.) 1/120 grain three times a day after meals and the purine-free diet is continued. After convalescence, a purine-poor diet is prescribed and colchicine is continued for one week out of every four. Deformities such as flat foot and contractures should be corrected and any infections should be cared for as with any other disease. The importance of the diet is stressed and it is suggested that if the blood uric acid is raised the purine-free diet may have to be continued or reinstituted.

X-RAY TREATMENT OF GAS GANGRENE

FOR eight years J. F. Kelly and D. A. Dowell (*Journal of the American Medical Association*, October 3, 1936, cvii, 1114) have treated cases of gas gangrene by means of X-rays with satisfactory results. Beginning in a modest way they have improved their technique and have particularly investigated results in those cases of involvement of the trunk. Since infected tissue was frequently left behind in patients with gas-gangrene infection of the limb, they consider amputation is no advantage. They sum up the present position by saying that X-ray treatment should be given in all cases, morning and evening, over a period of at least three days and of sufficient voltage to ensure penetration of the involved tissue. For this they advise from 90 to 100 kilovolts on an extremity, 1 mm. aluminum filter, from 130 to 160 kilovolts on the trunk with increased filtration, about 100 roentgens per treatment over each area. In addition, the specific serum should be used unless there is some contraindication, tetanus antitoxin should be given, and local surgical procedures (short of amputation) and antiseptics should be employed as indicated. Of a total number of 56 patients, 5 died, giving a mortality rate of under 9 per cent., which is claimed to be a result which will compare favourably with any other series in the literature.

REVIEWS OF BOOKS

The Practice of Medicine. By J. C. Meakins, M.D., F.R.C.P., F.R.S.E., LL.D. London : Henry Kimpton, 1936. Pp. xv and 1343. With 505 illustrations, including 35 in colour. Price 42*s.*

Professor Jonathan Meakins, Professor of Medicine, McGill University, Montreal, in his preface describes his treatise on the practice of medicine as an " audacious " work and thereby invites the comment which his French-speaking compatriots will not be slow to make concerning " l'audace, toujours l'audace." He frankly puts forward a claim to have provided a textbook not for specialists but rather for the student and practitioner, since it is to them that disease is daily presenting what he terms " clinical riddles." Reviewed from this point of view the volume must be regarded as an eminently successful venture. The clinical features of the various disease processes are kept well to the front of all the descriptive passages since it is " from these " that " the pathological conditions may be traced and identified." This is the correct approach for the student and general practitioner and to amplify a clearly-expressed text Professor Meakins has been lavish with illustrations which work out at approximately one to just under three pages of letter-press. They have been well chosen and the coloured plates, thirty-five in number, add greatly to the value of the book without apparently increasing its modest price. The first chapter, called "An introduction to the practice of medicine," is full of sound wisdom and analyses of the leading causes of death and of the presenting symptoms of disease in 1,000 patients, offer a valuable measuring-rod for the student at the outset as to the relative importance of what he comes to read later. The diseases and the various symptoms are described chapter by chapter and random sampling has indicated a broad outlook, tempered by a scientific scrutiny of facts and a masterly presentation of the salient features. Professor Meakins has done original work on many subjects, the best known of which is perhaps that on dyspnœa. It is natural therefore to turn to the sections in which this symptom is discussed. After describing the theoretical basis Professor Meakins sets out the principal causes of dyspnœa in a series of tables and the clinical adaptation of laboratory knowledge is well exemplified by the manner in which this is done. Other sections which have been examined reveal that a similar success has been achieved with many other clinico-pathological problems. This is an admirable textbook which can be whole-heartedly recommended to students and practitioners, and, despite the disarming attempt to keep them away, physicians and specialists will dip into its pages with considerable profit.

Pathological Physiology and Clinical Description of the Anæmias. By W. B. Castle, M.D., S.M., and G. R. Minot, M.D., S.D., F.R.C.P.E. Edited by H. A. Christian, A.M., M.D., LL.D., SC.D. New York : Oxford University Press, 1936. Pp. ix and 205. Price 15*s.*

This is a valuable reprint of the section contributed by Professors Castle and Minot to the Oxford Loose-leaf Medicine and all those interested in the modern developments of this branch of medicine will be grateful for the publication of this volume. Its scope can be to some extent gathered from the bibliography which includes 646 references and is modestly described as " in no sense complete." A particularly valuable feature of the monograph is not only this reference to the work of others in this field but the fact that, alongside with highly scientific accounts of the pathological physiology of disorders of the blood and blood-forming system, there is included in each instance a highly practical account of the latest measures in treatment. Practitioners will therefore find this volume useful in their practice and there should be no excuse for the incorrect prescribing of liver and iron for the indications are set out in concise detail. Professor H. A. Christian as editor of the present volume must be congratulated on securing the services of two such experts and on rendering their work available to a wide audience.

An Introduction to Dermatology. By E. H. MOLESWORTH, M.D., CH.M. (Sydney). With a Foreword by Professor JOSEF JADASSOHN. London : J. and A. Churchill, Ltd., 1937. Pp. xviii and 520. Plates 151. Price 25*s*.

DR. MOLESWORTH is to be congratulated on his courage in the production of another textbook of dermatology. The book is well written and is arranged with thought. The work is dedicated to Jadassohn and Whitfield and the latter is persistently quoted throughout. There are no coloured plates and many of the illustrations are poor, but references to coloured plates in Jacobi and Semon's atlases are meant to illustrate the text. Particular praise is due to the chapters on tumours of the skin and radiation therapy—matters of considerable concern to the practitioner in Australia. The sections on parasites, fungous infections, and lupus erythematosus are good, but not all the work is of this high standard. There is nothing about drug eruptions as such, many of the clinical descriptions lack crispness and convey but a vague picture, and views on etiology are sometimes old-fashioned and unsatisfying. Thus little but food idiosyncrasy is given as the cause of urticaria and dietetic indiscretions as a cause of rosacea. There is a strange forgetfulness of the psychological side of dermatological medicine throughout the work and Dr. Molesworth's advice to the psoriatic sounds unreal. He says, " To prevent the ill effects of a conviction that he is unclean it is well to urge the patient not to conceal the fact that he has psoriasis, but to join in with other young people and to explain to his associates that his malady is only psoriasis, a harmless and non-infective peculiarity of the skin." In the main treatment is dealt with satisfactorily and thoroughly, but in his elaborate and complicated local treatments of such common affections as acne, impetigo, and boils he asks much of human nature and rather departs from the sound principle of simplicity. Notwithstanding these criticisms, the book is a good one which can be recommended to students and practitioners and without doubt it will become the standard work in Australia.

The Diagnostics of Pain. By T. B. WERNØE. Copenhagen : EJNAR MUNKSGAARD : Oxford University Press, 1936. Pp. 116. Fig. 23. Price 7*s*. 6*d*.

THESE seven lectures, given in the autumn of 1934 by the author in

Copenhagen, are based on five years' experimental work under the direction of Professor A. Krogh, followed by clinical observations in the neurological department of the Rigshospital and at the Finsen Light Institute, and are to be followed by a larger work on special diagnosis of pain in various parts of the body. The present instalment is of a more general character and deals with the sensibilities of the tissues, the localization of pain, the classification of pain, and descriptions of the various kinds, namely direct and indirect (divided into projected and referred pains, and pain following primary motor excitation, pain due to primary vegetative stimulation, and psychogenic pain), and further combined pain. Much attention is paid to referred visceral pain, and the pioneer work of Carl Lange in the 'seventies of the last century, followed by Knud Faber, James Mackenzie, and Head receives due notice. This book is concerned with diagnosis of the cause and distribution of pain, and not with symptomatic treatment.

Illustrations of Regional Anatomy. By E. B. JAMIESON, M.D. Edinburgh : E. & S. Livingstone, 1936. Section VI : Upper Limb. Fig. 42. Price 7*s.* 6*d.* Section VII : Lower Limb. Fig. 52. Price 10*s.*

THESE two sections complete Dr. Jamieson's series of illustrations of human anatomy. They have been produced, as he says in his preface, " in response to repeated requests for them from all over the world." Medical students, particularly those who intend to take their primary fellowship examination, will be as grateful for these sections as they were for their forerunners. Such beautiful and detailed illustrations as these will prove of inestimable value both to students in the dissecting rooms and to those who are revising their anatomy at home.

The Management of the New-born Baby : A Guide for Midwives. By ALAN MONCRIEFF, M.D., F.R.C.P. London : Association of Maternity and Child Welfare Centres, 1936. Pp. 48. Fig. 5. Price 9*d.*

WRITTEN out of a rather exceptionally wide experience and addressed to midwives, this thoroughly practical and concise booklet will be useful to medical practitioners, and not only because it informs them what every midwife ought to know. From it the practising midwife will easily absorb the most modern methods of maintaining the health of the normal new-born. Information is also provided about the premature infant, birth injuries, and the more important disorders likely to come under observation. It is pointed out that any maternal toxæmia or the administration to the mother, within four hours of delivery, of a sedative, for example morphine, may induce a " poisoned " baby requiring much skill in resuscitation.

NEW EDITIONS

A System of Clinical Medicine by T. D. SAVILL, M.D., edited by AGNES SAVILL, M.D., and E. C. WARNER, M.D., F.R.C.P. (Arnold, 28*s.*), for its tenth edition has been revised on this occasion by seventeen collaborators and the continued popularity of this volume with its essentially clinical outlook on medicine should be assured. Very large alterations have been necessary to keep pace with the rapid developments of medicine and there is much new material in addition to revision of nearly every page. The whole work, now over one thousand pages including over fifty pages of index, is well produced and the publishers must share congratulations with the two editors for a thoroughly satisfactory textbook.

Textbook of Medicine by various authors and edited by J. J. CONYBEARE, M.C., M.D., F.R.C.P. (E. & S. Livingstone, 21*s*.) in its third edition, dedicated appropriately to Lord Nuffield, contains evidence of much revision and two new contributors add to the excellence of the existing team. Dr. P. M. F. Bishop has collaborated in the sections dealing with endocrine glands and Dr. W. D. W. Brooks has become jointly responsible with Dr. Geoffrey Marshall for the portions of the book dealing with pulmonary tuberculosis and diseases of the respiratory tract. The thousand pages which comprise the book give an excellent epitome of present-day teaching in medicine in the London medical schools.

Operative Surgery by A. MILES, M.D., LL.D., F.R.C.S.E., and Sir DAVID WILKIE in its second edition (Oxford University Press, 21*s*.) preserves the character of its original production and a large number of collaborators have again contributed sections where special knowledge seemed desirable. The Edinburgh school of operative surgery has a world-wide reputation and here in over six hundred pages of text, enhanced by over three hundred illustrations, is an epitome of its current teaching. For undergraduates and those working for higher surgical degrees this is one of the best manuals on the subject.

A Manual of Pharmacology (Edward Arnold & Co., 18*s*.), in its eighth edition, has been revised by W. A. M. SMART, M.B., B.S. The last edition appeared in 1929, but since Professor Dixon's premature death in 1931 his well-known manual has twice been reprinted. In this interval of seven years the rapid advance of pharmacology and the new edition of the British Pharmacopæia have necessitated a complete recasting of this textbook, greater stress on organic chemistry, and the insertion of numerous prescriptions to illustrate the practical applications of the text.

The Medical Directory, 1937, issued for the 93rd year (J. & A. Churchill, Ltd., 36*s*.), contains certain changes as regards typography in the London section which are presumably not unconnected with the increase in numbers revealed by the figures included in the table, which shows there are 657 more practitioners than last year, the only district showing a decrease being Ireland. It is perhaps not generally realized that this Directory as well as containing valuable information about members of the medical profession also gives lists of chartered massage workers, nursing homes, convalescent institutions, members of the Central Midwives Board, the Medical Research Council and other public bodies. This book is one of the indispensible portions of the medical practitioner's equipment.

NOTES AND PREPARATIONS

NEW PREPARATIONS

BENERVA.—This is the name given to a vitamin B_1 product issued by the Hoffmann-La Roche Chemical Works, Ltd., 51, Bowes Road, London, N.13. It is prepared in ampoules of 1 c.cm. containing 500 international units of vitamin B_1, or 1·25 mgm. of the pure crystalline substance obtained from natural sources and is given by intramuscular or subcutaneous injection. Successful results have been reported from the parenteral use of vitamin B_1 in polyneuritis and other conditions.

MATRILAC.—A preparation of milk sugar for preparing humanized milk with a carefully balanced proportion of vitamin D, iron and calcium salts. It is used in combination with cows' milk and enriches the milk in the substances in which it is likely to be deficient, forming a food which effectively replaces human milk. Matrilac prevents the development of anæmia and ricketty conditions and provides the mineral salts and vitamin D necessary for healthy growth. It is supplied in tins containing 8 oz. and 16 oz. by Boots Pure Drug Co., Ltd., Station Street, Nottingham.

MODASTIC SURGICAL GLOVES.—It is claimed that only the highest grade of rubber and materials are used in the manufacture of this new brand of rubber gloves. A tensile strength of over 3,000 lb. per square inch and an elongation of over 800 per cent. are among the laboratory standards employed and an important point made by the manufacturers is that these gloves are guaranteed not to deteriorate in stock. The prices per dozen are as follows:—Brown smooth finish, 10*s.* 6*d.*; brown rough finish, 11*s.* 6*d.*; latex finish, 14*s.* 6*d.* Further particulars can be obtained from Modastic, Ltd., Benson Street, Liverpool.

RHEUMELIN is an effervescent, granular preparation containing piperazine which is well known as an analgesic in rheumatic conditions. It is claimed that this drug gives excellent results in the treatment of rheumatism, gout, sciatica, arteriosclerosis, muscular pains and arthritis. It may be taken with safety over long periods and has no deleterious action. Rheumelin is supplied in bottles of 4 oz. by Boots Pure Drug Co., Ltd., Station Street, Nottingham.

VEGEMUCIN.—One of the latest additions to the number of medicaments available for the treatment of excessive gastric acidity is unusual in that it contains no alkalis but is composed of vegetable mucins in the form of a coarse powder, flavoured with chocolate. It is claimed for Vegemucin that it has a pronounced effect in adsorbing and neutralizing excessive gastric secretions purely by physical action. Manufactured by H. R. Napp, Limited, 3 & 4, Clements Inn, London, W.C.2, this new product is available in tins of 4, 8 and 16 oz. A sample supplied was of pleasant flavour and easy to take.

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CONSTIPATION AND ITS TREATMENT

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CONSTIPATION is generally regarded as the most common of all maladies and the cause of innumerable ills. I believe on the contrary that it is an uncommon and unimportant disorder, which rarely gives rise to symptoms. It is unusual to be consulted for constipation by a patient who is not already treating himself. The aperient habit generally begins for one of two reasons. The normal rhythm of the bowels may have been upset by an illness or accident confining the patient to bed, or by a period of stress in which he had no time to give to the calls of nature; medicine given for a temporary condition continued to be used when it was no longer required. Alternatively, the aperient was first taken by the patient for symptoms which he had been led to believe were caused by auto-intoxication resulting from constipation. But whatever the origin of the habit the patient regards himself as constipated because he *takes* aperients, which is a different thing from needing them. When eventually he seeks medical advice for his "constipation," he generally does so because he believes that any symptoms from which he may be suffering are a result of constipation. On inquiring about the state of his bowels, however, one learns that he is passing two, three or more large unformed motions a day—that he is, in fact, suffering from self-induced diarrhœa, and not from constipation at all. One is often told that he has not passed a solid stool for months or years and yet he ascribes his symptoms to constipation, although constipation means the passage of hard, dry and infrequent stools.

PHYSIOLOGY OF THE COLON AND DEFÆCATION

When the colon is watched with the X-rays no movements can be recognized under ordinary conditions, as the propulsive movements produced by the muscular coat occur only three or four times a day, and the churning movements produced by the muscularis mucosæ are so slow that they can be recognized only by comparing plates taken at intervals of a minute or more. The contents of the ascending colon are propelled to the pelvic colon by "mass peristalsis" in response to the gastro-colic reflex which occurs when food enters the stomach. The ascending colon is thus emptied in order to make room for the contents of the terminal ileum, in which most of the digestion and absorption of food takes place. The fæces are conveyed as far as the pelvi-rectal flexure, where their further progress is prevented by the valvular fold of mucous membrane which separates the movable pelvic colon from the fixed rectum. The pelvic colon, which gradually fills from below upwards, thus acts as a storehouse of the fæces, whilst the rectum remains completely empty.

Infants are trained to open their bowels when they are put on a chamber, no mental process being concerned in the act. In the course of time an elaborate conditioned reflex develops, in which getting up, a bath, dressing, breakfast, and finally sitting down with a newspaper and a pipe in the familiar lavatory take parts. As a result of this the biggest wave of mass peristalsis of the day occurs; the whole colon is involved and the pelvic colon empties its contents into the rectum. Distension of the pelvic colon produces discomfort in the lower abdomen, but distension of the rectum produces a perineal sensation which is the normal "call to defæcate." When, as a result of this conditioned reflex the fæces, collected in the pelvic colon during the previous twenty-four hours, enter the rectum, which is always empty except just before defæcation, they give rise to the call to defæcate. The diaphragm and abdominal wall are then voluntarily contracted; and the rise in pressure within the rectum calls forth the final reflex, which results in contraction of the rectum as a whole with relaxation of the anal sphincter, through which the fæces are evacuated.

CAUSES OF CONSTIPATION

Constipation may result from delay in the passage through the colon—colonic constipation, or incomplete evacuation of the pelvic colon and rectum in the act of defæcation dyschezia.

Many cases of constipation formerly regarded as colonic are caused by inefficiency of the conditioned reflex, which should result every morning in the partial evacuation of the contents of the proximal part of the colon into the pelvic colon as well as of the contents of the latter into the rectum. In the more obvious and common cases of dyschezia the conditioned reflex is unimpaired, but it is not followed by the defæcation reflex proper in which the rectum contracts and the anal sphincter relaxes, so that the rectum is found to be packed with fæces at whatever hour it is examined. This form of dyschezia often originates from neglecting to respond to the call to defæcate owing to laziness, insanitary conditions of the lavatory or false modesty. The double reflex is progressively impaired; the rectum dilates so that an increasing quantity of fæces is needed to attain the adequate internal pressure required to produce the call to defæcate, and finally the sensation is lost completely. The patient, however, is still capable of emptying his rectum if he tries, but by now he has generally convinced himself that he cannot get his bowels opened unless he takes enemas, or such enormous doses of aperients that the fluid fæces act as enemas and require no effort for their evacuation.

Dyschezia may be due to other causes, such as weakness of the voluntary muscles of defæcation, the assumption of an unsuitable posture during defæcation, and voluntary inhibition from fear of pain in diseases of the anal canal. But whatever the primary cause, the final result is the same. The defæcation reflex is lost, and the incomplete evacuation of the rectum results in the accumulation of fæces and consequent dilatation of the rectum.

SYMPTOMS

A great number of symptoms have been ascribed to the auto-intoxication caused by constipation. But under normal conditions little undigested protein, carbohydrate and fat reach the cæcum; the small amount of toxic products of bacterial activity absorbed from the colon and ascending colon are rendered innocuous by the liver or are rapidly excreted by the kidneys. In the comparatively rare cases of constipation, in which there is a considerable degree of stasis in the proximal part of the colon, bacterial activity is hardly greater than under normal conditions, as the quantity of food which escapes digestion and absorption in the small intestines is not increased. In dyschezia the fæces in the pelvic colon and rectum are solid, so that there is very little bacterial decomposition however long they are retained; moreover absorption can take place only from that part of the surface of the scybala which is in contact with the mucous membrane. This is in contrast with what occurs in the proximal colon, where the churning caused by the activity of the muscularis mucosæ brings all the contents into intimate contact with the mucous membrane. On the other hand, most aperients hasten the passage of chyme through the small intestine so that an abnormal quantity of undigested food and water reaches the colon, which is consequently filled with fluid or semi-fluid material. Here putrefaction and fermentation are active and the more or less toxic products are readily absorbed by the mucous membrane. Fortunately, in most healthy people the liver and kidneys are able to deal with the absorbed toxins so efficiently that toxic symptoms do not occur. If, however, aperients are taken in excess for long periods, symptoms of auto-intoxication appear, especially if the liver or kidneys are inefficient.

In dyschezia the retention of solid fæces in the rectum, which is normally empty, may give rise to a number of reflex symptoms, such as headache and general malaise, which disappear immediately the bowels are opened. The instantaneous relief proves that these symptoms cannot be due to auto-intoxication. Moreover, experimental distension of the rectum with a large plug of wool produces identical symptoms. The pressure on the surrounding parts by the retained fæces also gives rise to hæmorrhoids, to perineal discomfort, and occasionally to pain which may spread to the sacral region and even down the back of the legs.

DIAGNOSIS

A patient complaining of constipation should be instructed to take no aperient and to make an effort to open his bowels every morning after breakfast, even if he feels no inclination to do so. If he succeeds it is clear that he was not constipated at all and that both the local and general symptoms of which he complains are the result of purgation. If, on the other hand, the bowels are not opened, the abdomen and rectum should be re-examined. An empty colon and a full rectum indicate the presence of uncomplicated dyschezia: an empty rectum indicates the presence of inability of the colon to empty its contents into the rectum, and an attempt should be made to ascertain where the retained fæces are collected. If hard scybala can be felt in the pelvic colon through the anterior rectal wall, pelvic colon dyschezia is present. If the cæcum and ascending colon are distended with soft fæces and little or no accumulation is felt elsewhere, the comparatively rare condition of ascending colon constipation is probably present. In doubtful cases the diagnosis should be confirmed and amplified by an X-ray examination carried out while the patient is not taking an aperient, but the colon should be completely evacuated by an enema the evening before the opaque meal is taken.

TREATMENT

In a large proportion of cases constipation can be cured by restoring to activity the defæcation reflex, which has been allowed to become inefficient by neglect and by constant interference with its normal performance through the habitual use of aperients. Simple explanation of the physiology of defæcation and encouragement are often all that is required, but it may be necessary to reduce the work the muscles of defæcation have to perform by giving liquid paraffin or an unabsorbable vegetable mucilage to increase the bulk and soften the fæces, together with a diet containing plenty of fruit and green vegetables.

The vast army of hypochondriacs, who are never happy unless their stools conform to an ideal which they have invented for themselves, can be cured only by making them realize that fæces have no standard size, shape, consistence or colour. They must learn to follow the example of the dog instead of the cat—and never look behind them.

When there is a genuine tendency to constipation, the patient should be instructed to take some kind of fruit, fresh or preserved, raw or cooked, with each meal, and green vegetables or salad with both lunch and dinner. Stewed prunes for breakfast are particularly useful. Proprietary foods containing large quantities of roughage should be avoided, as their coarse ingredients are a common cause of gastritis and they have no advantage over fruit or vegetables.

All patients with constipation, and especially those with "greedy bowels," whose fæces are deficient in bulk, benefit from the use of substances which pass through the alimentary tract without being altered by digestive juices or bacteria and which by their bulk and consistence render the stools sufficiently large and soft to be easily propelled along the colon and expelled from the rectum. It is essential, however, that they should be of an unirritating character. For this reason psyllium seeds should never be used; they burst in water which becomes slightly syrupy, but no jelly forms, and their ends remain so sharp that they lead to considerable irritation of the gastric and intestinal mucous membrane. They may suit canaries, but ought never to be given to human beings. Liquid paraffin and certain vegetable mucilages, which are unaffected by the digestive juices and by bacteria but absorb water to form a syrup or jelly, fulfil the required conditions. Liquid paraffin, which has the disadvantages of sometimes causing flatulence and sometimes leaking from the anus, can be given in doses varying from one teaspoonful to one tablespoonful after breakfast and at night. Among the vegetable mucilages which may be prescribed are agar-agar, and the proprietary preparations isogel, coreine and normacol, all three of which form a uniform jelly with water. The usual dose is a teaspoonful once or twice a day. It is important to avoid the numerous preparations in which the beneficial effects of liquid paraffin and vegetable mucilages are more than outweighed by the irritant action of phenolphthalein and other purgatives which have been added to them.

A small proportion of patients with constipation cannot be cured without the aid of drugs. The most generally useful aperient is senna, which has the advantage of increasing the activity of the colon without affecting the small intestine. The requisite number of pods should be infused with cold water for three hours. The infusion should be drunk on going to bed, or, in individuals in whom it acts slowly, after dinner or even earlier in the day, and if experience shows that it causes any discomfort, between 5 and 15 minims of tincture of belladonna should be added to it. The number of pods should be varied from day to day till the proper dose is found —one which produces a single-formed stool after breakfast. An average initial dose is six pods. An attempt should be made from time to time to reduce the number by one at a time. By this means it is often possible to re-educate the colon to act without artificial help; a dose of ten or more pods may in this way be gradually reduced to zero.

It is necessary to warn against the indiscriminate use of every new purgative pill introduced from abroad. One of the latest to gain popularity is a preparation which is said to contain extract of intestine and extract of bile with lactic acid ferments and 0·05 gm. of agar-agar! Not one of these ingredients can have the slightest effect on the bowels. The published constitution acts on the imagination, but there must also be some active ingredient which acts on the bowel. Senna pods have the advantage over pills of all kinds in that the dose can be more accurately adjusted to the needs of the patient from day to day.

The majority of cases of dyschezia can be cured by simple re-education of the defæcation reflex, but it is sometimes necessary to begin the treatment by giving graduated enemas. When the patient is unable to evacuate his rectum by a simple effort of will although it is loaded with fæces, an enema of one fluid ounce of glycerin should be given each morning if a voluntary effort has again proved unsuccessful. The strength of the enema should be gradually reduced by replacing one fluid drachm of glycerin by an equal quantity of water every other day until only water is used. As a rule the normal defæcation reflex and with it the tone and contractile power of the rectum quickly return, but it is sometimes necessary to continue to use a dilute glycerin enema for a few weeks. When dyschezia is due to inability of the pelvic colon to empty its contents into the rectum six fluid ounces of liquid paraffin should be injected on going to bed and retained during the night; the bowels are generally opened without difficulty in the morning, and they gradually regain their normal activity so that the paraffin enemas are no longer required.

Regular exercise in the open air helps to keep the bowels active. For people who are busy all day five minutes' walk just before or after breakfast is often enough to call forth a defæcation reflex which would otherwise not occur. Exercises for the abdominal muscles, and especially of the muscles of the pelvic floor, are of great value for patients in whom dyschezia is in part due to weakness of the voluntary muscles of defæcation.

CARCINOMA OF THE STOMACH AND INTESTINES

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CARCINOMA, in whatever organ it occurs, calls attention to itself in one or more of three ways: by forming a lump, by interfering with the function of the organ which it attacks, and finally by causing a cachexia. The stomach and intestines, the former partially concealed by the lower thoracic cage, all of them covered by the strong muscles of the abdominal wall, are not easily appreciated by the examining hand; and a lump caused by a carcinoma of these viscera must be of some magnitude, and therefore present for some considerable time, before it can be detected with certainty. In the majority of cases, the disease is so insidious and the symptoms so slight and indefinite, that a considerable area of the stomach may be involved or a definite degree of stenosis of the large bowel may be present before the patient seeks advice for indigestion or constipation. With carcinoma of the large intestine in particular, it is well known that the disease may already be inoperable and yet the patient may not present any appearance of cachexia, nor indeed any loss of weight. These three considerations help to explain why the majority of patients consult their medical attendants for the first time with the disease well advanced.

[Carcinoma of the small intestine is so uncommon that it will not be considered in this article.]

CARCINOMA OF THE STOMACH

The stomach is the commonest site of cancer in the male subject, in whom it is twice as common as in the female, and in whom it occurs most commonly between the ages of forty and sixty. The disease, in the majority of cases, begins *de novo* in the stomach, though Hurst believes that it is preceded by a chronic gastritis with comparatively few symptoms; in the minority (about 10 per cent.) the disease follows on a chronic gastric ulcer, and is known as ulcer-cancer.

Symptoms.—When a middle-aged patient, who has hitherto been free from any abdominal discomfort, begins to develop indigestion, which persists or if it remits, the freedom is of very short duration before symptoms return, the possibility of gastric carcinoma must be at once entertained. The discomfort is definitely associated with meals, and tends steadily to get worse. Loss of appetite and in particular a distaste for meat is an early and common sign, and indeed sometimes appears to precede the discomfort. Anæmia develops and this may be so extreme that the appearance of the patient may suggest the diagnosis of pernicious anæmia. Flatulence and vomiting are common, the vomitus frequently being "coffee-grounds" material, and with the progress of the disease the patient rapidly loses weight, strength and energy. Not infrequently the disease, or rather the first symptom of the disease, appears with remarkable suddenness, the discomfort or pain or vomiting may follow a particular meal on a particular day, or a sudden attack of fainting due to a moderately copious gastric hæmorrhage may be the first indication of the disease which the patient has appreciated. When the disease begins at the pylorus, which is its most frequent site in the stomach, stenosis tends to occur with the resulting dilatation of the stomach and all the signs and symptoms of pyloric stenosis. When it tends to occur towards the cardia, it may spread to the œsophagus and will then produce the signs and symptoms of carcinoma of the œsophagus.

Ulcer-cancer.—A small percentage of cases of carcinoma of the stomach develop from a preceding gastric ulcer, and this must be remembered when treating a chronic peptic ulcer. If the symptoms of the ulcer alter for the worse, in spite of rest in bed and adequate dietetic and medicinal treatment, if the periodicity of the symptoms disappears, if relief does not rapidly follow adequate treatment, if the ulcer is seen to be large or to be increasing in size by the radiologist, if the pain becomes constant and the appetite fails, the likelihood of a malignant change is great, and no further time must be wasted in medicinal treatment. The late signs of carcinoma of the stomach, a palpable tumour of the organ, advanced anæmia, abdominal metastases, enlarged left supra-clavicular glands, and great wasting are of little importance and indicate that the disease is too advanced for any hope of cure.

Diagnosis.—All cases of persistent abdominal discomfort at any age must be fully investigated, and particularly so at the common age-period of cancer of the stomach. A careful study of the history of the case, and a full clinical examination are the first steps, after which come the all-important gastric analysis, the X-ray examination of the opaque meal, and the tests for occult blood in the stool. As regards the latter, occult blood will tend to occur constantly, in spite of adequate treatment, owing to the persistent oozing from the ulcerated surface of the gastric carcinoma. This persistent occult blood is a strong indication that the gastric disease is a carcinoma. A fractional test-meal must be done, particular attention being paid to the resting juice. T. Izod Bennett points out that the latter is the most important part of the investigation. Its quantity and quality must be investigated and the most important abnormality is its foulness, and the evidence of decomposition in the altered blood. The greater number of cases of gastric carcinoma have a complete achlorhydria, a small percentage a hypochlorhydria whereas in ulcer-cancer free acid is present.

The radiological examination of an opaque meal is next in importance. While a large growth presents no difficulty in diagnosis, in that it causes a large and constant filling defect, the early growth is extremely difficult to diagnose, and when situated on the lesser curve may be almost indistinguishable from a chronic peptic ulcer. The larger the ulcer, the more likely it is to be malignant and the differential diagnosis may only be made by the mucous membrane pattern. Barclay points out that there are two sites where cancer may be overlooked: the fundus, where palpation cannot be applied, and the pyloric end of the lesser curve, where the wall of the stomach is thick. So important is it to make the diagnosis of cancer of the stomach at the earliest possible moment and so easy is it to overlook early disease or to find it impossible to distinguish between it and a chronic peptic ulcer, that radiology of the stomach must be left in the hands of the expert and must not be carried out by the individual who occasionally screens a patient.

These methods of examination, the study of the history, the clinical examination, the tests for occult blood, gastric analysis, and the X-ray examination of the opaque meal are the methods whereby cases of suspected carcinoma of the stomach are studied. Gastroscopy is a further method of examination, which is being increasingly used in the study of gastric disease, and is of definite value, but has not been developed to such an extent that it can yet supersede the standard methods of examination.

In addition to the above tests, and the complete clinical examination, it may be necessary to examine the blood (1) in the case of anæmia to differentiate between carcinoma of the stomach and pernicious anæmia, and (2) in the presence of a tumour of the stomach to exclude the possibility that it may be due to syphilis of the stomach.

Treatment.—Carcinoma of the stomach can only be cured by gastrectomy, and then only when the disease is in its early stages. Patients who present themselves with a palpable tumour have a poor chance of cure, with the exception of some cases of pyloric carcinoma which have produced early obstruction at the pylorus. The operability of any case cannot be definitely decided on until the abdomen has been explored, and the extent of the disease, its fixity, the involvements of glands and adjacent parts investigated. Patients with pyloric stenosis due to inoperable growth can be made less uncomfortable, if a short-circuiting operation is done between stomach and jejunum.

CARCINOMA OF THE LARGE INTESTINE

From the duodenum to the termination of the small intestine, carcinoma of the bowel is a rarity and is seldom diagnosed, but in the large intestine it is again a common disease, more especially at its lower end. At all parts it is accessible to the surgeon, who regards carcinoma of the colon as a much more hopeful proposition than carcinoma of the stomach.

Carcinoma of the large intestine presents itself in two main ways, (1) the constricting type, and (2) the symptomless tumour type of the cæcum. The constricting type is the common form of carcinoma throughout the large intestine and causes a slowly progressive form of intestinal obstruction, the patient having to take larger and larger doses of aperient to get his bowels to act.

Symptoms.—The patient, usually of middle age but frequently younger, begins to find increasing trouble in getting his bowels to act. After a time there is a complaint of occasional discomfort in the abdomen, which later in the disease, when the narrowing becomes extreme, develops into a definite recurrent colic, associated with borborygmi and abdominal distension. Occasionally with these symptoms, the patient may complain of loss of appetite, and belching of wind and may consider that he is suffering from dyspepsia: and the medical attendant sometimes finds it difficult to determine whether the patient's symptoms point to trouble in the stomach or in the large intestine.

The clinical examination of such a patient may reveal no obvious signs of disease, there frequently being no loss of weight nor loss of appetite; but a suggestive sign—particularly in a stout patient—is that percussion of the abdomen shows a large area of the abdomen to be resonant, whereas under normal conditions percussion of the abdomen yields a flat note. Late in the disease, but as a rule only in a thin subject, visible peristalsis may be seen and noisy borborgymi may be appreciated by the examining hand.

If the patient disregards these symptoms, he will eventually develop a complete intestinal obstruction, with gross abdominal distension, absolute constipation and the characteristic vomiting of the condition. Some cases—and it is surprising how frequently it happens—are first seen when acute intestinal obstruction is present. Occasionally the acute onset may be the result of the intussusception of a hitherto permeable carcinoma, but as a rule it is the culmination of a chronic intestinal obstruction, the patient having disregarded the increasing stubbornness of his bowels.

The above account represents the method in which the average case of carcinoma of the colon presents itself to the surgeon, but there are certain features of the disease associated with particular sites.

Carcinoma of the hepatic flexure.—In this region, perhaps because of the fluid nature of the colonic contents at this point, the stenosis of the colon is advanced before any obvious symptoms have developed, and the patient presents himself complaining of recent stubbornness of the bowels, and of definite recurrent attacks of abdominal pain in the right iliac fossa, associated with noisy borborygmi. If such a case is examined during an attack of colic, it is quite common to see visible peristalsis passing up from the right iliac fossa to the costal margin, and to appreciate the associated borborygmi.

Carcinoma of the transverse colon.—In this region, in addition to the symptoms of chronic intestinal obstruction, the carcinoma often forms a noticeable mass, which may have been discovered by the patient. Such a mass may be strikingly mobile for a long period and can be moved widely through the abdominal cavity.

Carcinoma of the splenic flexure.—This area, being under cover of the left costal arch and so inaccessible to the examining hand, is one of the two areas, the other being the pelvic colon in which quite commonly acute intestinal obstruction is the presenting symptom.

Carcinoma of the lower pelvic colon and rectum.—Here, the symptom known as spurious diarrhœa appears. Owing to the developing stenosis, the solid motion of the lower reaches of the large intestine tend to block the diminished bowel lumen. The associated colitis above the growth, and the ulcerated surface of the growth allow small amounts of fæcal material, blood and mucus to trickle through the stenosed area, and enter the rectum. This fluid material stimulates the rectum, and the patient becomes conscious that he wants to empty his bowel, and gets rid of a small amount of the flatus and of an evil-smelling dark liquid stool. The more severe the stenosis, the more marked is this spurious diarrhœa, and the patient becomes worn out by repeated calls to stool.

Carcinoma of the anal canal.—Here as it is in the final sensitive muscular channel, and is distended by each bowel action, obvious bleeding is an early symptom, in addition to pain, particularly during defæcation. Enlargement of the inguinal glands may be present. The patient may regard these symptoms as being due to "piles."

Carcinoma of the cæcum.—The common type of carcinoma in this region is a mass which increases in size without causing obstruction until late in the disease. The patient may be the first to discover the abdominal lump, or may complain of vague symptoms of indigestion or of loss of strength, weight and energy or of increasing anæmia.

Three other conditions must be considered when dealing with a symptomless mass in the right iliac fossa, chronic hyperplastic tuberculosis of the cæcum, Crohn's disease a similar non-tuberculous condition in the terminal ileum, and a chronic appendicular abscess. Actinomycosis of the cæcum is alleged to cause a similar mass, but is rarely met with and at any rate is not diagnosed until the abdominal wall of the right iliac fossa shows one or more chronic sinuses with great induration of the surrounding tissues, the condition having followed an operation for acute appendicitis. Hyperplastic tuberculosis of the cæcum may simulate carcinoma very closely, and indeed at operation it may be impossible to differentiate between the two conditions. The former condition tends to occur at an earlier age than carcinoma, and is frequently a complication of phthisis. It causes as a rule symptoms of chronic indigestion, and on account of this the patient tends to go down hill. On examination, a mass, with little mobility, can be detected in the right iliac fossa, and an opaque enema shows a gross filling defect. Occult blood, however, is not present in the stool, whereas with carcinoma it is constant.

Chronic appendicular abscess.—An attack of appendicitis may be a very quiet affair in elderly people, perhaps only a few hours of discomfort in the abdomen, which may have been forgotten when four or five weeks later a mass is found in the right iliac fossa. This mass is generally fixed and surprisingly free from tenderness, and unassociated with any rise of temperature. This condition may be very difficult to distinguish from carcinoma, but inquiry may elicit the history of some unusual discomfort a few weeks earlier, there may be a leucocytosis, there is no filling defect when examined with the opaque enema, and occult blood is absent from the stool.

In the left iliac fossa difficulty in diagnosis may arise between carcinoma of the colon and diverticulitis, for the latter may be the cause of the formation of a mass, and of increasing constipation in an habitually constipated person, while the former, which does not here form an easily palpable mass, occasionally becomes acutely inflamed and rapidly increases in size. The careful study of the history of the case, the patient elderly or middle-aged with a well-covered body, the likelihood of previous mild recurrent attacks of discomfort and tenderness in the left iliac fossa, the radiological examination of the opaque enema both during its administration and after its evacuation, the absence of occult blood from the stool, and the negative result of a sigmoidoscopy will as a rule make the diagnosis of diverticulitis obvious. But there are some cases, in which uncertainty remains after the most searching examination and may still remain even after inspection at operation. There may be difficulty in distinguishing ulcerative colitis from carcinoma of the pelvic colon because of the symptom of frequent stools, but if the case is properly investigated, no mistake should be made. The copious fluid stool of ulcerative colitis, containing pus and blood, is entirely different from the small evil-smelling liquid stool of carcinomatous obstruction low in the large intestine: the sufferer from ulcerative colitis is anæmic and obviously ill, with bouts of temperature and frequently with a history of previous attacks, whereas a patient with carcinoma has usually not suffered in his general health. Digital examination of the rectum and sigmoidoscopy will make the distinction between the two conditions clear.

Rectal strictures, whatever their pathology may be, cause the same symptoms as malignant disease of this region, i.e. constipation and spurious diarrhœa and frequently incontinence, but the history and in particular the digital examination make the diagnosis certain. The definite prominent everted edge of the carcinomatous ulcer is so striking that it cannot be taken for anything else, nor can the tubular rigid stenosed rectum, due to trauma or inflammation.

Fæcal impaction may uncommonly cause difficulty in diagnosis, but the history of habitual constipation, the ease with which the mass in the left iliac fossa can be moulded by the fingers, and the presence of hard scybalous masses in the rectum should make the diagnosis certain. More difficult to diagnose are those cases of volvulus of the pelvic colon, due mainly to long overloading of this part of the bowel, when the case is seen as one of intestinal obstruction, associated with abdominal distension and vomiting. In such a case it is quite likely that the pre-operative diagnosis may be carcinoma, but operation will reveal the true cause.

The *diagnosis* of carcinoma of the large intestine is arrived at by the careful study of the case, the clinical examination and by the following routine methods of examination: (1) The inspection and digital examination of the anus and rectum. (2) The examination of the stools. (3) The tests for occult blood and for pus. (4) Proctoscopy and sigmoidoscopy. (5) The opaque enema and occasionally the opaque meal. (6) Examination under anæsthesia.

These methods are so well known that very few comments need be made. "Piles" cannot be accepted as a cause of blood in the stool, until they have been seen to be present. "Bleeding piles" cannot be felt by the finger. The surgeon should always inspect the stools and should not rely on a nurse's report. Every case of carcinoma of the colon oozes into the lumen, and therefore occult blood will be a constant finding. In order that a proper view of the interior of the bowel may be obtained by sigmoidoscopy, the patient must be efficiently prepared, and this preparation may take three or four days. The X-ray examination of the opaque enema must be carried out by an expert radiologist, whose report on his observations is the main foundation of the diagnosis of carcinoma proximal to the midpoint of the pelvic colon. Occasionally a case is met with, in which occult blood is found constantly in the stools, but all the other examinations are negative. What should be done in such a case? I believe this to be one of the few occasions when an exploratory operation is demanded.

Treatment.—Resection is the only curative treatment for carcinoma of the large intestine, except the squamous-celled carcinoma of the anal canal, where there is an alternative treatment in radium. The condition, however, is complicated by the presence of intestinal obstruction, which makes resection and an intestinal anastomosis a dangerous procedure. The first step, therefore, in all cases of carcinoma of the large intestine is to overcome the obstruction, and this is done by means of some type of colostomy proximal to the growth. The bowel is drained for two or three weeks, during which time attempts are made by lavage to clean that part of the colon, which is to be removed, and the patient's general condition improved to enable him to withstand the surgeon's attack.

CHRONIC PEPTIC ULCER

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FREQUENCY, INCIDENCE AND CAUSATION

ABOUT five per cent. of the population die with signs of active or healed gastric ulcer (Hurst). Probably an even greater number show similar evidence of duodenal ulcer, although only fifty years ago medical literature made little mention of ulcer in this site. To-day, in spite of this comparatively recent recognition, duodenal ulcer is the most frequent organic cause of persistent indigestion below the age of forty. Out of 280 of my own patients with chronic indigestion I found that 35 per cent. suffered from peptic ulcer, of whom nearly two-thirds were duodenal. At the Mayo Clinic[4], among 3,000 patients investigated there were five times as many cases of duodenal as of gastric ulcer. Gastric ulcer has an approximately equal incidence in the two sexes, but duodenal ulcer is found between three and four times more frequently in men than women. Both types of ulcer are essentially conditions of active life when the stresses of work, marriage and wage-earning are greatest. They are rare below the age of fifteen and in only about ten per cent. of cases do they arise above the age of fifty. Duodenal ulcer tends to begin rather earlier than gastric ulcer, in 62 per cent. of my duodenal cases the onset being below the age of 30, as compared to 47 per cent. of my cases of gastric ulcer. On the whole the poor are more affected than the rich, but no class or occupation is immune. Those whose work involves long hours without food, irregular meal times, or alternating night and day duty are especially prone to ulcer; motor drivers, postmen, waitresses, nurses and doctors are among the most affected, as are those who work under great nervous strain. For at least fifty years physicians have emphasized the importance of nervous factors in the causation of peptic ulcer, and recently Davies has again insisted on this point; worry, anxiety, and nervous tension—whether occupational or otherwise—have certainly in my own experience played an important part in a high proportion of cases. In particular, duodenal ulcer tends to develop in the nervous individual of tall "linear" type, with high intercostal angle, whose stomach and mind alike are both over-active and quickly responsive to nervous stimuli; often restless, energetic, conscientious, commonly taking pleasures hardly and "working" even when at leisure ; as Draper describes them, "Mental sprinters, with intense but rapidly spent energies and but little endurance."

In between ten and twenty per cent. of cases a family history of ulcer is found and a constitutional tendency or predisposition to this condition can hardly be doubted. Of external causative factors tobacco smoking has often been suggested and in many cases certainly brings on symptoms, but out of 116 of my own patients no less than 46 had never smoked and 24 had had recurrences in spite of giving up smoking altogether. Chronic infective foci are frequently found in patients suffering from peptic ulcer. Of such foci inflammation of the appendix is especially important, and oral and upper respiratory infection may play a part in causing gastritis and ulcer; in the latter case bad mastication of food has also to be considered, but the treatment of dental infection is often disappointing in the prevention of relapse (Davies, Alvarez).

SYMPTOMS AND COURSE

Peptic ulcer has some spontaneous tendency to heal and its symptoms are characteristically intermittent. Periods of pain or discomfort alternate with periods of freedom. At first the free periods may be long and the pain periods short; transient attacks of "indigestion" in the spring and autumn, or with cold winds, or after a bout of anxious heavy work, quickly relieved by some alkali or a holiday, are the usual mode of onset. So easily are the symptoms at first relieved by simple measures that it is quite uncommon for patients to consult a doctor within two years from their first attack.

The *pain* of peptic ulcer may be severe and boring, or there may be only discomfort, described by the patient as a tightness or fullness and attributed to wind; as a rule, however, it is enough to interfere seriously with concentration and work, and seems to exercise a particularly depressing effect upon the mental outlook.

There is nearly always some definite relationship of the pain to food; the nearer the ulcer is situated to the pylorus the longer after food is the pain likely to be delayed, so that hunger pain is especially characteristic of duodenal and juxtapyloric ulcers. But the time relation of food to pain is a rather uncertain guide whether an ulcer is gastric or duodenal. The pain is epigastric and usually central; it may go through to the back, especially when the ulcer is adherent to the pancreas; pain to the left towards the heart and spleen suggests a site high up on the lesser curvature of the stomach. Ulcer pain is particularly apt to waken patients out of sleep, and indigestion which rouses a patient during the night and demands food or alkali for its relief is more often due to ulcer than to any other cause. The relief of pain by alkalis is typical of peptic ulcer, but is also found in other types of indigestion, notably that due to gall-bladder disease.

Ulcer pain is nearly always worse with fatigue, and its association with anxiety or worry is so frequent an occurrence that there is a real danger of diagnosing a nervous dyspepsia on this account. Paradoxically the more the patient himself seems to wish the practitioner to believe that his indigestion is entirely due to worry, the more important it is to suspect an ulcer, since many psychoneurotic subjects are only too anxious to minimize or hide a nervous cause and stress an organic one. *Vomiting* occurs more often in gastric than in duodenal ulcer; when it is bulky and comes on late in the day it suggests pyloric stenosis; the vomit is usually acid, burning the throat and setting the teeth on edge. *Nausea* is frequent in both types of peptic ulcer, but not more so than in nervous, colon or gall-bladder cases; persistent nausea without true pain is unlikely to be due to ulcer. *Water brash*, or the filling of the mouth with tasteless saliva, is on the contrary very suggestive of duodenal ulcer, being relatively infrequent in other conditions.

The appetite is usually good, and the foods which especially bring on pain are varied; in some cases the patient is so frightened to eat on account of the pain that he reduces his diet to a minimum and for this reason may lose a great deal of weight. As a rule, meat, alcohol, raw fruit, salads, and fried dishes are the most provocative of pain. In uncomplicated cases a *milk diet* taken at regular intervals will nearly always afford relief either partial or complete.

Marked *anorexia* suggests a carcinoma of the stomach and when this symptom develops in a patient suffering from gastric ulcer the possibility of malignant change must be seriously considered.

PHYSICAL SIGNS AND DIFFERENTIAL DIAGNOSIS

The diagnosis of peptic ulcer has mainly to be made by careful study of the history and skilled radiography, since physical signs may be few or absent. In many cases there is a localized area of tenderness on pressure in the epigastrium; this area is often small, and may be central or to one or other side of the mid-line. Central tenderness may be due to pressure over the abdominal aorta and a tender spot to the side of the mid-line is therefore of more significance; during an active phase the upper part of the rectus muscle on one or both sides may be resistant, but this is not constant. Tenderness widely diffused over the whole epigastrium is against the diagnosis of uncomplicated ulcer, and it must be especially remembered in diagnosis that such tenderness frequently arises from the liver or transverse colon; in the former case there will usually be found some tenderness along the whole right costal margin, and in the latter over the sigmoid and cæcum in the iliac fossæ also.

Competent *radiography* is able to afford a definite diagnosis of gastric ulcer in some ninety per cent. of cases, and of duodenal ulcer in only slightly less; presumptive evidence can be found in a considerable proportion of the remaining cases. It should be generally accepted as imperative to carry out an X-ray examination in all cases of suspected ulcer not only in order to confirm the clinical diagnosis, but also to show any complication such as early pyloric stenosis, hour-glass contracture or malignancy, as well as the rate of emptying, peristalsis, and tone of the stomach.

The chemical test for *occult blood* in the stool is simple to perform and should be carried out both as an aid to diagnosis and for the control of treatment; in almost every case of peptic ulcer this test is positive at some stage of the condition, but a negative result does not exclude ulcer and in assessing the value of a positive result extraneous sources of bleeding (e.g. teeth, gums, piles) must be excluded. Persistently positive tests on repeated examinations during treatment should arouse a suspicion of malignancy. When the diagnosis remains in doubt after radiological examination a *test meal* may help to distinguish ulcer from carcinoma of the stomach, but cannot be relied upon to decide between gastritis and ulcer; normal variations are so great that this method of examination is of subsidiary diagnostic importance.

The *differential diagnosis* has most frequently to be made from chronic gall-bladder dyspepsia, carcinoma of the stomach, nervous indigestion, and disorders of the colon, including chronic appendicitis. Gall-bladder disease may closely simulate ulcer, but occurs more frequently in women, usually above the age of 40; the bouts of acute "indigestion" are as a rule shorter than in ulcer and complete freedom from symptoms is less frequent. A cholecystogram is of great assistance in distinguishing the two conditions, which may not uncommonly co-exist together. In carcinoma of the stomach the history is usually short; but a long history cannot exclude a growth, which may develop secondarily upon a gastric ulcer; the appetite is bad and discomfort is more persistent in growth than in ulcer and less often relieved by food. Nervous indigestion usually follows some definite psychological cause, but again it must be emphasized that ulcer frequently develops in subjects of nervous indigestion; the symptoms are often more related to the emotions than to food and rarely wake a patient in the night. Radiological examination is often essential before ulcer can with certainty be excluded.

In colon and appendix dyspepsia the discomfort is more often in the lower abdomen, is more related to the bowel actions, and is often worse with exercise or jolting such as car driving; constipation is frequent with ulcer but the passage of mucus and bouts of diarrhœa suggest a primary colon dysfunction.

TREATMENT

Peptic ulcer is primarily a medical disease and should be treated medically unless there are special reasons or complications requiring operative measures. Since, moreover, evidence points more and more to general and constitutional factors as well as purely local digestive ones in causation, treatment must be directed to the patient as a whole and not only to his stomach and duodenum. Proper rest and relaxation, both mental and physical, a regular life, avoidance of excesses, and freedom as far as possible from worry and anxiety are important points that must not be ignored. It is for these general reasons that so often a patient who responds badly to medical treatment also responds badly to surgery and therefore the advice to "operate whenever medical treatment fails" needs careful qualification.

Treatment must be modified to individual cases but, in general, surgery is least successful in young patients, those of neurotic type, and those with a bad family history of ulcer; it should not be advised unless thorough medical treatment has failed to give relief, in which event there is probably some complication present or an associated lesion such as appendicitis or cholecystitis. Relapse after one or even two courses of medical treatment is not an immediate indication for operation, but frequent recurrence in spite of continued and thorough medical treatment usually means that surgery is advisable, though the percentage of lasting relief in such cases is not likely to be above sixty or seventy per cent. Perforation, organic pyloric stenosis, hour-glass contracture of the stomach, or the strong suspicion of malignant change, are all definite indications for surgical treatment. Hæmatemesis is a symptom of peptic ulcer which calls for the greatest judgment; if the bleeding is severe and is repeated, the mortality under any form of treatment is high, and the best hope probably lies in operation with the aid of blood transfusions either repeated or by the continuous-drip method. A single hæmorrhage from an ulcer is rarely fatal and healing may be especially rapid under medical treatment.

MEDICAL TREATMENT

Medical treatment essentially depends upon "resting the stomach," and must aim at lessening gastric movements and reducing acid gastric secretion as much as possible.

This is not to be obtained by starvation, for hunger-peristaltic contractions are strong and an empty stomach may have a high unneutralized acid juice. Moderate filling by frequent soft or fluid feeds, the avoidance of hard or stimulating foods, and physical and mental rest reduce the activity most. Alkalis or antispasmodics are only subsidiary to these principles of diet and rest and ulcers *may* be healed without the help of either.

At the start of treatment rest in bed is always advisable, though this need not restrict baths, visits to the toilet, or a short time up in a chair once a day. Competent control of the diet is vital and for this reason a nurse at home or institutional treatment is almost essential. Strict diet and rest can rarely be relaxed under one month, but there is no certain guide as to how long it may need to be continued. Symptoms may disappear after twenty-four hours' treatment, and deep epigastric tenderness may be lost soon after; frequent repetition of X-ray examinations is difficult; the test for occult blood in the stools may be negative though the ulcer is still active; gastroscopy may directly show healing to have occurred, but is not easily obtained. For these reasons it is wise to err on the side of keeping up treatment too long rather than stopping too soon.

DIET.—The regularity and frequency of the feeds are of even more importance than their exact composition, and so far as possible the patient's likes should be consulted, especially remembering that hunger may mean failure.

First stage of Diet

Feeds must be given at the start two-hourly and may conveniently be arranged as follows: 7, 9, 11 a.m., 1, 2, 3, 5, 7, 9, 11 p.m. Night feeds are an important part of treatment, though some authorities advise these only if the patient is awake. At least one feed at 1 a.m. should be ordered, and it is my own practice to insist upon two, one at 1 a.m. and the other at 4 a.m. Five- or six-oz. feeds should be ordered for the first week, but if the patient feels hungry 8 oz. may be given from the start. The feeds may be varied from the following:—

Milk, egg and milk (1½ pint of milk and 3 eggs, mixed, and kept on ice), Benger's, Horlick's, Allen & Hanburys diet, ovaltine, or similar preparations. The one o'clock feed and 7 p.m. feed may consist of a vegetable cream soup (potato, artichoke, pea or tomato). One rusk may be ordered with alternate feeds or one sponge finger. An ounce of cream should be added to three of the feeds, and two or three spoonfuls of fruit jelly given after one or more; a little ice-cream may be allowed once a day, and half to one ounce of orange juice. A little glucose or sugar may be added to each feed if the patient prefers. A small piece of barley sugar or chocolate may be sucked after the feeds, but not swallowed whole. Milky feeds may be just flavoured with cocoa or tea and be iced or warm; if plain milk feeds are ordered one tablespoonful of a 5 per cent. sodium citrate solution should be added to each feed. After one week, cornflour, ground rice, milk pudding, arrowroot, baked custard, junket, finely purêed stewed apple, and purêed vegetable may be added to one or more feeds, and ten to twelve rusks may be taken during the day. Sips of water are allowed freely throughout treatment.

No relaxation in times of feeding is allowed for at least three weeks, and in no case while occult blood persists in the stool. If X-ray control is possible further changes in diet may be judged by this, but even radiological disappearance of an ulcer-niche does not necessarily mean complete healing, and therefore some persistence of treatment is still essential after this for a time.

Second stage of Diet

If healing is satisfactory, usually at the end of three to four weeks, pounded fish, boiled eggs, mashed potato, toast or stale bread, and butter may be added, and the times between feeds slightly lengthened; one night feed is continued, however, for a further one or more weeks unless the history is a very short one. The regime may now be as follows:—

7 a.m., alkaline powder; 8 a.m., boiled egg, one slice toast and butter, marmalade jelly, milky tea; 10.30 a.m., 6–8 oz. Benger's food with 2 sponge fingers; 1 p.m., 4 oz. pounded fish with 3 oz. mashed potato, stewed fruit with custard or junket, 2 thin lunch biscuits with ½ oz. cream cheese and butter; 3 p.m., alkaline powder; 4 p.m., 2 slices toast with butter and apple jelly or honey, 6 oz. milky tea; 6 p.m., 6 oz. ovaltine or Benger's food; 8 p.m., poached egg on toast, 6 oz. milk, custard or junket; 10 p.m., 6 oz. malted milk, 2 biscuits; 11 p.m., alkaline powder; 2 a.m., 6 oz. egg and milk, malted milk, or milk.

After a further one to four weeks on this diet, making a total period of from 4 to 8 weeks from the start of treatment, or even longer in unfavourable cases, the diet is increased by the addition of chicken, lamb, tongue, rabbit, tripe, sweetbread, minced liver, which may be ordered at either lunch or dinner.

Third stage of Diet

The times of feeds may now be ordered as follows :—

8 a.m.	Akaline powder.
8.30	Breakfast: Egg, toast and butter, milky tea, marmalade jelly.
11	Cup of milk and biscuit.
1 p.m.	Vegetable soup, chicken or meat (as above), with mashed potato, sieved vegetable; milk pudding with cream, stewed sieved fruit (apple, prunes, peaches), cream cheese with biscuit and butter.
2.30	Alkaline powder.
4.15	Tea with *plain* cake or biscuit.
6.30	Alkaline powder.
7.30	Dinner—as lunch but with egg or fish in place of meat.
10	Milk, or malted milk food.
11	Alkaline powder.

This regime should be maintained for one to four months, making a total of from three to six months altogether.After this it is as a rule safe to allow a normal diet with the precautions given below which as far as possible should be maintained for the rest of the patient's life.

Rules for Ulcer Patients

(1) Eat slowly and bite all food thoroughly.
(2) Try to allow time for meals and avoid as far as possible worry and

interruptions during meal-times.

(3) If time is short do not eat hurriedly but take some milk and biscuits in place of a full meal.

(4) Do not go longer than two-and-a-half to three hours without food, e.g. milk.

(5) Keep the bowels acting properly.

(6) If pain returns, go back at once to the fluid diet.

(7) *Avoid* especially:

Highly flavoured foods, cheese (except cream cheese), high game, pickles, vinegar, spices, mustard, curry, strong meat soups, meat extracts, strong tea or coffee.

Rough foods, e.g. celery, radishes, coarse vegetable, watercress and lettuce stalk, wholemeal bread or biscuits, Ryvita, peel in marmalade, buns or cake, currants, nuts, raisins; fish with fine bones, e.g. herring, or very salt fish. All hard raw fruits such as apples, pineapple, unripe banana, pears, fruit with pips such as figs, tomatoes, or skins of fruit.

Be moderate in all fried dishes and indigestible starchy foods, such as new potatoes, pastry, new bread. Take meat only once a day, and preferably chicken, lamb, tongue, veal, rather than beef, bacon or pork.

Eat mainly eggs, milk, custards, jellies, plain biscuits, toast, butter and cream.

Take no spirits or any alcohol on an empty stomach.

Smoke only in moderation and not when hungry.

DRUGS.—Massive dosage with alkalis is unnecessary and may be dangerous; even a dose of six heaped teaspoonfuls a day for only nine days of a simple alkaline powder caused fatal alkalosis in one patient whom I was asked to see. With strict dieting and rest ulcers can heal without the use of any alkalis at all, but small doses between feeds up to four or six times a day are helpful, especially during the period after strict dieting when the patient returns to his normal diet and routine. A powder which I prescribe is as follows :—

℞ Sodii bicarb. - - - - -	1 part
Calcii carb. - - - - -	3 parts
Magn. carb. - - - - -	3 „
Bismuth. carb. - - - -	2 „

One teaspoonful to be taken with milk or water.

Synthetic magnesium trisilicate has a high neutralizing and adsorbent action and in a dose of 20 to 60 grains between feeds is particularly useful without risk of alkalosis. Belladonna and atropine have little action upon the stomach except in fairly large dosage, but are of value when there is pyloric spasm and hypersecretion; a dose of tinct. belladonnæ 10 to 15 minims or atropine sulphate $\frac{1}{150}$ to $\frac{1}{100}$ grain, sufficient to produce dryness of the mouth and slight dilatation of the pupil should be ordered. For constipation an emulsion of liquid paraffin and magnesia is satisfactory, and strong purgatives such as calomel or colocynth should be avoided. Senna preparations may safely be used, and simple enemas are often needed during the early part of treatment. If there has been loss of blood with anæmia the iron and ammonium citrate 30 to 40 grains may be added to an alkaline mixture three or four times a day even during the period of strict dieting. Astringent tonics are to be avoided.

ADDITIONAL MEASURES IN TREATMENT

Protein injections in the form of vegetable, milk, bacterial, or other foreign proteins have been widely used in treatment, and my experience with such substances (novoprotine and T.A.B. vaccine) suggests that they may afford some aid to other treatment by diminishing gastric secretion, and perhaps lessening peristalsis, and promoting healing. No form of injection therapy can replace careful dietetic treatment, and if its use in any degree lessens the attention to detail in treatment it is to be condemned. In particular must this be said of a course of injections of histidine—an amino-acid—which has been claimed to take the place of all other treatment. Sufficient experience has now been gained of histidine treatment to show that in spite of frequent symptomatic relief, relapse follows in a high percentage of cases and results in general do not in any degree justify the neglect of well-founded principles of treatment.

Duodenal feeding is a method of treatment which is widely used in France and has its greatest field of usefulness in chronic ulcers high on the lesser curvature of the stomach. It is usually fairly well tolerated by the patient but as a rule demands institutional or nursing-home treatment for its success.

PROGNOSIS

Although not more than some two to five per cent. of cases of peptic ulcer actually die directly from their ulcer, it is doubtful if more than about sixty to seventy per cent. remain permanently well even when competently treated. Patients treated medically ultimately relapse in over a quarter of the cases; those treated surgically continue to have symptoms in a variable proportion of cases according to the selection of the patients and the skill of the surgeon, the best figures of lasting relief being as high as ninety per cent., and the worst as low as thirty-five per cent. Gastritis, jejunitis, and anastomotic ulcer follow gastro-enterostomy in a considerable proportion of cases, figures differing as widely as three and fifty per cent. being reported for the incidence of gastrojejunal ulcer. Prognosis can only be judged individually and must take account of constitution, heredity, age, habits, mode of life, including occupation and income, and will be most hopeful when the judicial combination of skilled medical and surgical treatment is available. Not until more knowledge is gained of the causation of peptic ulcer and its prevention, is further advance in treatment likely to improve markedly the prognosis of this disabling disease. In no condition is the need for willing co-operation on the part of the patient, and persistent care on the part of the practitioner, more needed, and relapse is most often due to failure of one or other of these essentials.

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NERVOUS DYSPEPSIA

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FUNCTIONAL dyspepsia may be defined as that state which produces abnormal sensations in the abdomen related to the ingestion of food, but not accompanied or due to any structural change in the stomach itself. Some classification is helpful and there is reason for distinguishing three groups. First there are the habit dyspepsias due to improper food, the bolting and deficient mastication of food, or the excessive indulgence in alcohol and in tobacco. Secondly may be classed the reflex dyspepsias due to organic disease elsewhere as shown in lesions of the gall-bladder, the appendix and the colon. And lastly there are the nervous dyspepsias. These include many types. Such dyspepsia may be transient and readily dealt with, or of long standing and most intractable. It is with this dyspepsia of nervous origin that this article is mainly concerned.

When the day's work is over and the harness is laid down, the normal man enjoys the pleasing anticipation of a good meal, his senses of sight and smell are stimulated, there is the pouring forth of appetite juice, the stomach is prepared, and digestion " waits on appetite and health on both." His natural sense of hunger is replaced by a comfortable fullness and contentment. Such a physiological cycle of hunger and its pleasing satisfaction with food may be his blessing for years. Suddenly, maybe, he finds that he has lost all appetite but fails to associate this new departure with his anxiety over a speech he has to make at dinner that evening. He may return from such a dinner complaining of an uncomfortable fullness which may actually amount to pain, he vomits, and sometimes is ready to blame some article in the menu, although it was his anxiety which was responsible for the temporary failure of gastric function. It may be that he hears of some calamity while at his meal and he has to retire and vomit. In other words even the normal man who may pride himself on a first-class digestion occasionally, under severe strain or anxiety, may show the symptoms of a grossly disturbed gastric function.

Physiologists demonstrated many years ago the quickness with which the stomach became active in animals at the sight and smell of food, and clearly showed the cessation of peristalsis and the drying up of secretion when the animal was frightened by a stranger or a peculiar noise. The salivation of the dog when he anticipates a portion from the table is known to all. Similar digestive zeal goes on in the stomach. Anger, fear, and other emotional states will stop peristalsis and secretion in the animal and man. Cannon refers to an ancient custom in India of detecting a suspected criminal among a group. All are required to eat a meal of rice and the culprit is detected by his deficient salivation and swallowing. Beaumont in his classical observations on Alexis St. Martin found that an outburst of anger changed the lining membrane of the stomach, and the secretion either greatly lessened or was entirely suppressed. There is therefore sufficient in the animal world and in human experience to indicate an intimate connection between the nervous system and gastric function.

If under certain disturbing conditions the healthy man suffers such dyspepsia, it is not to be wondered that the more sensitive and more frail are frequently victims. The cause may be intermittent or prolonged. What would be productive of much mental distress in one person may give rise to no concern in another. It may be that the anxiety is hidden away and never disclosed, although it has been in existence for years; it is only with difficulty that it can be brought to the surface, and perhaps only to be shown as a real and major anxiety which can not be allayed. It is certainly true that the majority of patients with nervous dyspepsia are unduly sensitive—they are ready victims to fatigue, headache, periods of poor concentrating power, and often complain of palpitations, insomnia and other nervous manifestations. Some, however, show no such traits, and, provided there is no extra burden and no increased responsibility, are able to carry on quite efficiently and quietly. When, however, they are confronted with some sudden stress or anxiety, symptoms arise and persist until " fair weather " returns.

HYPERTONIC AND HYPOTONIC GROUPS

Attempts to classify have not met with much success, although there is some use in recognizing that a large number can be divided into two groups—those that show hypertonus and hypersecretion, and those that show hypotonus and hyposecretion. In the former males predominate, the dyspepsia is usually intermittent, and the discomfort will often be described as a pain. The pain may be related to food and come on sometime afterwards with more or less regularity and be relieved both by food and by alkalis. In the hypotonic group women predominate, there are more signs of malnutrition, the appetite is frequently poor, and the discomfort is usually more constant and often made worse by food and relieved only by rest. While it may be from the therapeutic point of view helpful to distinguish broadly and roughly these two groups, it must be remembered that symptoms may be quite distressing yet the tone and secretion be quite normal. It may be well to recall the perfect digestion which is often found in a person who shows a true achylia, and in another whose stomach is so low as to be in the pelvis, yet with a good digestion. Alvarez aptly stated his opinion when he expressed the following : " I think I would as willingly ascribe symptoms to a large navel, to a hooked nose, or to flaring eyes as to a mobile cæcum or to a redundant sigmoid flexure." It is possible that the sensitivity of the digestive tract is abnormal, as Hutchison suggested, and that these people feel as discomforts and pains, sensations which to the normal man would be of no significance. Sufficient is there of anomalies and contradictions to prohibit any classification on the basis of tone, position or secretion.

SYMPTOMS

The symptoms are of necessity vague, and usually confined to the abdomen. Flatulence, as Ryle has pointed out, is probably the most common symptom, combined with a sense of fullness after meals; later discomfort and eventually pain may be complained of. The appetite may be normal or excessive, but in women, especially if the condition has been long standing, the appetite is poor and readily appeased. It is not uncommon for the poor patient to present a full account of her symptoms all written out lest she might forget any, and often at the same time sheets of diet are produced, which have been tried but with little success. In spite of past failure she is ever ready to try another diet, and follow a rigid line since she is convinced her trouble is in the abdomen. With the passage of time and constant restriction of food there is eventually loss of weight and strength and smouldering foci of infection may light up or the bone-marrow fail and some degree of nutritional anæmia supervene and dominate the clinical picture. At this stage remissions are few and short in duration, although a pleasant surprise, good news, or a change in surroundings may bring silence to the abdomen for a while. In the milder forms the symptoms are often intermittent and especially in the male, freedom may be enjoyed for months until some new or increased responsibility brings back the symptoms again. Pain, if complained of, is not usually located so sharply by the patient as it is in ulcer. The ulcer patient will use his forefinger to show the seat of pain, while the nervous dyspeptic employs his whole hand and places it on the upper abdomen. Perhaps too much diagnostic importance is attached to the location and periodicity of pain. Certainly it is possible to meet with the complete symptomatology of ulcer, the pain with its onset from two or three hours after food, its relief with food and alkalis and subsequent investigation disclose no ulcer, and on further inquiry it is found that a sudden emotional upset preceded the symptoms. While it is necessary to gain the fullest information of the symptoms and their relation to food they can never alone be sufficient evidence on which to form a diagnosis. Some symptoms are very suggestive—the belching to order, the discomfort as soon as awake, the relief from discomfort with friends, and the return of symptoms with friction at home or in the office. The physician may have suspicions during the first fifteen minutes, but it would be unfair and certainly unkind to stamp such a person as a neurotic. It is sad to reflect how keen and enthusiastic the physician may be in demonstrating the correlation between a large ulcer crater and the symptoms complained of, or a gall-bladder neatly filled with stones with its train of symptoms, and how his enthusiasm wanes when, after similar investigation, he finds no organic counterpart to the symptoms. The practitioner often shows this change of front to the disappointment of the patient, and he goes on his trail seeking and searching for the help which fails to come his way.

The normal and perfectly-balanced man may remain unmoved and his digestion function perfectly in spite of many untoward events. The more sensitive will often be upset by even minor episodes. It may be that their job is too big, the responsibilities taken over may be taxing the nervous system too much. The anxiety may be at home, a friction which is daily present, which may never be removed, and cannot be discussed or exposed. When such anxiety or some hidden fear persists, symptoms are likely to persist. It is possible to see a sudden fall of the stomach during an X-ray examination when the patient is frightened by a spark. Pyloric spasm and gastric retention may also be demonstrated and found persistent until the man regains his usual composure. These events are probably common in the daily life of the dyspeptic, and a good day is one in which there has been little to disturb the mind, and a bad day one in which the nervous system has constantly bombarded the stomach. With the continued noise and bustle of life it can be expected that more will show their disharmony in this form of dyspepsia. There is less table ceremonial today than in days gone by, the senses are not stimulated as they were, and less time is devoted to the relaxation of meal-times.

TREATMENT

It is obvious that before treatment can succeed the diagnosis must be established beyond all shadow of doubt, and the patient must be equally convinced as the physician of the correctness of the diagnosis. Doubt and uncertainty will bring further fear and its added symptoms. However nervous and "functional" the picture the patient may still be the victim of a superimposed organic disease. The problem must be approached in a frank and unbiased manner. A superficial and rapid examination is not likely to relieve a dyspepsia which has existed for years. The fullest knowledge not only of the abdominal symptoms, but also of the man, his work, his home, his anxieties and worries is essential, and by this method of getting to know the man a bond of understanding and friendship is created, which in itself begins its good work. It will be necessary to exclude dyspepsia due to faulty habits, alcohol, tobacco, poor masticating power and rushed meals. It will also be necessary to exclude disease of the appendix or the gall-bladder, constitutional disease such as tuberculosis of the lungs, and lastly any organic or structural change in the stomach itself. Before he can be encouraged to believe that the trouble lies not in his stomach, he must be assured most firmly and by all the means available that there is no hidden lesion there. Doubt must be cast aside once and for all, and to attain this an X-ray examination is of course essential. A test meal will also demonstrate not only to the doctor, but also to the patient, his digestive capacity. The fuller the investigations the easier it is to gain the confidence of the patient and the more ready the soil will be for the seed of sound advice.

When the diagnosis is established, and all organic disease is excluded, it is important to explain to the patient as sincerely and sympathetically as possible the mechanism involved in the production of his symptoms. To give an impression that the physician's task is now over, that he has served him to the extent of excluding disease and that now he should be able to put his house in order himself may succeed with a few, but it does little for the majority. I know of no finer understanding of this patient than that shown by Alvarez whose words are worth quoting in full :

" I have always felt sympathy for anyone with ' nervous indigestion.' I feel sorry for those who early in life find themselves equipped with a nervous system so frail, so sensitive or so poorly balanced that it breaks down under even the ordinary stresses of life. I feel sorry for those who started with a good body but who later broke it down either through ignorance or folly or force of necessity: some had burdens put upon them heavier than they could bear, while others met with misfortune, disappointment, unhappiness and grief. I feel sorry for those who on account of hypersensitiveness and illness and strain have become so crochety and unpleasant that they repel those who might otherwise help them, and I feel sorry for those who, while seeking for help and guidance, fall into the hands of men who wittingly or unwittingly rob them, maltreat them, and make them worse."

It will be well to explain the connection between gastric function and the nervous system, how in the normal person this is daily at work—the sight and smell of food stimulating via the nervous system the stomach to its work. The influence of fright and fear on the juices in the animal and the cessation of gastric secretion which can be readily demonstrated arising from emotional upsets. Emphasis should be made of regular meal times, the traditional ceremonial of meals, the avoidance of topics which bring friction and misunderstanding. As Solomon wisely said " Better a dry morsel and quietness therewith, than a house full of feasting with strife." It may be necessary to advise ceasing work earlier, to rest for half an hour before the evening meal, and to arrange lunch away from business associates. But in addition, knowing the man and his anxieties, the physician may have to advise a lessening of his responsibilities, more hours of leisure and some week-end recreation. Psychotherapy must be practical, and, if followed, will often produce benefit readily recognizable to the patient.

In a certain number dispelling the fear of some hidden disease is all sufficient. A change in fortune may also accomplish the same good work. In some the worries are deep, and, indeed, when they are brought to the light of day they are seen to be anything but transient. Even so, some good will come from the realization that the dyspepsia and this permanent anxiety are connected. So long as the shadow is there, there will be dyspepsia, but with it a quiet resignation rather than reaction and a restless search for some mysterious diet or drug to cure.

Success depends also on the adviser; he needs to be sympathetic but also firm. His ability to exclude disease must also be accompanied by a full knowledge of human affairs, and when he gives advice it must be given in no uncertain terms; hesitation and doubt will make all treatment fail. The success of the quack and his pill—the result of his emphasis—is often seen when the more learned and honest help has failed.

If the patient is ill nourished and fatigue and insomnia are part of the picture a rest cure is often most helpful. Proper sleep with the help of such sedatives as luminal or amytal, appetizing food and quietness throughout the day and night will do much. If there is evidence of muscular atonia massage and sunlight will also help. There can be no specific diet. An attempt should be made to make the under-nourished gain in weight, for this gain is a mental tonic in itself. If there is pain or discomfort some hours after food, and there is hypertonus and hypersecretion, alkalis will be of service. Each case must be regarded as a highly individual problem and the treatment must vary with each patient. Drugs and diet are subsidiary, and not the corner stone of therapy.

I should like to record my indebtedness to Alvarez whose book on " Nervous Indigestion " contains so much wisdom and understanding.

DIGESTIVE DISORDERS OF CHILDHOOD

By RICHARD W. B. ELLIS, M.A., M.D., M.R.C.P.

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ALTHOUGH its reactions are less violent than during infancy, the digestive system of the older child still remains the principal concern of the pædiatrician. The child who won't eat, the child who vomits, the costive child, and the child with colic, reappear with unfailing regularity. Acute diarrhœa, on the other hand, though by no means an uncommon symptom throughout childhood, occurs much less readily and usually gives rise to far less serious disturbances of acid-base and water balance in the older child than during the first two years of life.

THE CHILD WHO WON'T EAT

It is a familiar experience, on asking about the appetite of any child of five or six, to be told in all sincerity " He never eats a thing, doctor!" If one is at first a little puzzled why and how so many active and well-nourished children appear to be surviving on the chameleon-diet of light and air, it soon becomes obvious that what is really happening is that they are never eating all that is being put on their plates. It is difficult for parents to realize how small a bulk of food (as long as the diet is well mixed) a child of five requires, and that although he may recently have become a schoolboy he still weighs only about twice what he did when twelve months old. In every such case the child should be weighed and measured, and if the parents can be convinced that his development is within normal limits for his age, and that he shows none of the signs of malnutrition, their anxiety about his appetite may be allayed.

There are, however, many cases in which true anorexia is a much more serious problem. The child awakes feeling nauseated, and from breakfast onward every meal becomes a stage set with the wretched child as central figure before a background of parental coaxing, coercion, offers of reward or threat of punishment, tears, transparent tricks, and finally despair. The most adoring parents are often those who have learnt the most ingenious devices for harrowing the child's affections and defeating their own object. While an over-anxious parental attitude will often engender and almost invariably increase a child's anorexia, it will be well not to assume this as the primary cause until other possibilities have been considered.

Organic disease should be suspected if the condition has arisen suddenly in a previously well child, when there is no corresponding emotional trauma to account for it. Any infection, of which those of the upper respiratory tract and of the renal tract are perhaps the commonest, may give rise to anorexia, while the possibility of tuberculosis (miliary or meningeal) should be borne in mind. Occasionally in childhood, anorexia and wasting will prove to be the first symptoms of diabetes mellitus, when inquiry will usually elicit a history of increased thirst and polyuria. In other cases, it will be found that a state of anxiety, arising from causes such as over-pressure of school-work, too high demands on the child's emotional or intellectual development, or an unhappy home situation, is manifested clinically by disinclination to eat. The over-solicitous parent, clutching at a straw to break the camel's back, will be only too ready to attribute all the child's troubles to the anorexia, and by focusing the whole household's anxiety on this one symptom will go far to perpetuate a situation which, if left alone, might well resolve itself. In fairness it should be added that not infrequently it is to the doctor, or to one of his more dogmatic little books on rearing normal children, that the trouble can be traced. There is little justification for detailing diets for healthy children over the age of two, and the forced inclusion of foods that the child dislikes will sometimes lead to refusal of the rest. Davis's extremely interesting experiments on " self-selected diets," in both infancy and childhood, have shown that the average child if given a reasonably wide choice will select a diet which will compare favourably with that prescribed by the average doctor. By having available at every meal a number of foods, such as fruit, raw carrot, cheese, hard-boiled eggs, and rusks, which will not spoil if not eaten, it is possible to provide a wide choice with little wastage and without extra cost.

Treatment of anorexia will consist in relieving the primary cause when possible, and by enlisting the co-operation of *both* parents and nurse in ensuring a tranquil atmosphere at meal-times. It is essential that the child should cease to feel that every mouthful is a matter of attention and comment by a circle of grown-ups. Small children will generally concentrate and eat better in the nursery with a placid nurse, and older children will often show a dramatic improvement if they can have their middle-day meal at school with other children, and be "allowed to get on with it." In other cases, a complete change of environment, to a convalescent home or boarding school or to a sympathetic relative with a congenial family (since the condition is particularly common in only children), may offer the best solution. Fresh air and exercise are important, though it should be remembered that these children are often readily fatigued and that the "hearty" atmosphere can easily be overdone.

Drugs play little part in treatment, and are apt to concentrate attention on the symptom. However, when anorexia follows a debilitating illness it is often useful to prescribe Syr. ferri phosphatis co., or before meals a mixture containing tincture of ginger or dilute hydrochloric acid. In cases of great wasting, good results have been claimed for a course of insulin injections, though in children it is necessary to guard carefully against hypoglycæmia.

THE CHILD WHO VOMITS

Occasional vomiting attacks, precipitated by infection or over-eating, come within the experience of most normal children; the attacks are of short duration, and cause little general disturbance of health. It is quite otherwise with "habitual vomiters." These unfortunate children form an unenviable, if fashionable, race apart, for whom the most trivial upset—a tram ride, the prospect of a party, or a sore throat—may involve days of nausea, vomiting, and prostration. The terms "cyclical vomiting" and "acidosis" are comforting rather than helpful, since there is seldom if ever any strict periodicity in the attacks, and the ketosis that develops appears to be the result rather than the cause of the vomiting. In investigating the individual case, it is well to remember not only that the recurrent attacks may be due to repeated attacks of acute appendicitis or even volvulus, but that *acute appendicitis may occur in a child known to be subject to recurrent vomiting.* It follows that in each attack the child must be examined as carefully as though the attack were the first, and particular attention paid to any complaint of abdominal pain before the vomiting has become severe. In doubtful cases, a bismuth series of X-rays between attacks may give useful information.

In a small proportion of patients there is evidence that the condition is migrainous. A family history of migraine, and the occurrence of severe headache and visual disturbances, preceding the vomiting, should suggest this diagnosis. The attacks are then best treated by rest, fluids, and the administration of caffeine and aspirin at the first onset of headache.

The remaining group may be divided for practical purposes into those cases in which recurrent infection (particularly of the upper respiratory tract) appears to be the precipitating cause of the attacks, and those in which nervous factors (excitement, anxiety, or fatigue) predominate. Any obvious site of infection such as tonsils or sinuses should be attended to, and other precipitating causes, including any known food idiosyncrasies, as far as possible avoided. These children usually do best on a low-fat diet, avoiding cream, fried foods and rich pastry, with ample carbohydrate suitably spaced throughout the day, e.g. a sweetened drink during the morning and last thing at night. Within these limits, a reasonable choice of foods should be given. Glucose should not be prescribed in preference to other forms of carbohydrate such as rusks, honey, or barley sugar, if the child finds it unpalatable. At the onset of an attack, which is usually heralded by constipation and anorexia or nausea, a grey powder or small dose of calomel should be given if there is no abdominal pain, followed if necessary by an enema. The child should lie down in a darkened room, and have nothing by mouth except dry toast and sweetened fluids such as orange-juice, lemonade or barley water. This will often serve to abort an attack. If vomiting has started, small, frequent drinks of sweetened fluid only should be allowed; this may contain 30 to 60 grains of sodium chloride to the pint, to replace the chlorides lost in the vomitus. It is inadvisable to give any considerable amount of sodium bicarbonate to small children unless the bicarbonate-reserve can be estimated periodically, as there is a definite danger of its continued administration converting the condition into an alkalosis. In the most severe cases, it may be necessary to wash out the stomach with saline and to give fluids parenterally. Return to solid food should be made cautiously, by way of toast, bread and honey, and sweetened cereal. No fats should be given until the child has completely recovered.

THE COSTIVE CHILD

In listening to the familiar complaint of habitual constipation, it is advisable to pay more attention to the character of the stools than to their frequency. If the child is passing soft, formed stools, without difficulty, at regular intervals, the fact that evacuation is not occurring daily is of relatively little importance. Similarly it is unwise to attribute such symptoms as lassitude, anorexia, and headache to constipation, when the constipation itself may be only one symptom of an infection. The degree of fæcal retention that can sometimes exist without apparently affecting the general health of the child is remarkable, and it is not uncommon to find an enormous abdominal mass, simulating a retroperitoneal sarcoma, in an active child with clean tongue and good appetite, prove to be impacted fæces.

Much of the irregularity and true constipation that occurs in children of school age is due to their having had faulty training in infancy and too much interference subsequently. For the toddler, defæcation provides one of his earliest opportunities of learning concentration. He is unlikely to do this unless the routine is carried out quietly, with a minimum of distraction and fussing. To put a baby on his pot in a room with other children, or to make the matter a battle of wills between him and his supervisor is asking for failure. The young child is naturally interested in, and proud of, his excrement, as of everything else connected with his body. His stools are the first gift he can make to his mother. Fortunately, most mothers realize this instinctively, and make successful defæcation a matter of thanks and congratulation. On the other hand, the withholding of a stool is one of the few ways in which the baby can assert his personality in a universe almost entirely controlled by grown-ups, and if wrongly handled he is liable to show an obstinate refusal to defæcate at the proper time. This attitude will often persist into later childhood.

A good example occurred recently in a boy of ten, who was admitted to a ward where the sister was somewhat of a martinet. He would go obediently to the lavatory each morning when ordered to, and his bed-chart bore a daily stroke. On his discharge, he joyfully confided to his mother that he had not really had his bowels open for seventeen days, "not because he couldn't, but because he wanted to keep it till he got home!"

It should be emphasized from the first that a regular habit should be a matter of personal responsibility and pride. Too much parental interference defeats its own object. All practitioners know the mother who says "Yes, I keep him regular, but it takes me all my time!" and the little boy who never knew where his bowels were because his mother was always moving them. It is equally important to see that the school-child has adequate time and opportunity for defæcation before leaving for school in the morning; too often it is left too late, or the only available lavatory is needed by several children simultaneously.

As regards diet, it is a good principle to start by increasing the constipated child's fluid intake, and at the same time abolish the Friday-night purge. This and attention to training, will often prove to be all that is necessary. If there is little roughage in the diet, fresh fruit and vegetables should be introduced, and stewed prunes given at breakfast time. Outdoor exercise should be encouraged, and if the child is hypotonic and disinclined to play, a course of massage or daily exercises under supervision is likely to be beneficial.

Drugs should as far as possible be avoided, and used with the purpose of helping to establish a regular habit rather than maintaining it. Liquid paraffin is a harmless lubricant, and it can be made relatively palatable with lemon-juice, Mist. rhei cum soda and syrup of senna have their advocates, but saline or other purges are quite unsuitable for prolonged use.

THE CHILD WITH COLIC

Of all childhood symptoms, colic is probably the most worrying for the doctor. It can never be safely disregarded, and the question "Is it appendicitis?" has always to be answered. The history of the pain has usually to be obtained at second hand, and most small children, when asked to localize their trouble, will put their hand upon their one fixed point, their umbilicus. It follows that a satisfactory physical examination must be obtained at all costs. There are many familiar tricks for examining a child's abdomen, but a warm hand and a cool approach are the first essentials. If the child is frightened or hurt or chilled at the beginning, the difficulties will be doubled. It is often a good plan to slip the hand under the bedclothes for a preliminary palpation with the tips of the fingers before the abdomen is uncovered, while in other cases a warm bath will be found to give almost as good relaxation as an anæsthetic. The abdomen should be carefully watched for suppression of abdominal respiration, which will help to distinguish acute abdominal pain from referred pain due to an early pneumonia.

In those cases in which appendicitis is suspected, but when there is no tenderness in the right iliac fossa, the importance of rectal examination in unmasking a low pelvic appendix and of extension of the thigh a retrocæcal one, hardly need emphasis; Rendle Short has pointed out the significance of tenderness on pressure over Poupart's ligaments and pubes in cases in which an inflamed appendix hangs just over the pelvic brim. Any manœuvre likely to be painful should be left until last.

Without detailing the differential diagnosis, certain features of abdominal pain in childhood may be brought to mind. In pain due to early pneumonia, the respiration rate and temperature will be higher than is usual in appendicitis. It may be twenty-four to forty-eight hours from the onset of illness before signs of pneumonia can be detected in the lungs, and abdominal distension is often severe in younger children. Vomiting seldom persists after the first few hours. Colic due to dietary indiscretions is more likely to be associated with diarrhœa than with constipation, and the temperature is normal or only slightly raised, there is little abdominal tenderness or rigidity, and the white blood-cell count is hardly altered. In all cases the throat should be examined, as an acute streptococcal infection of the pharynx may be associated with a non-tuberculous mesenteric adenitis giving rise to pain somewhat simulating appendicitis. Similarly, abdominal pain may be the presenting symptom in acute rheumatism.

Recurrent attacks of colic associated with vomiting should always suggest the possibility of appendicitis, since "chronic appendicitis" in childhood is represented almost always by repeated acute attacks, in any one of which the organ may rupture. Less commonly, recurrent symptoms of partial obstruction may be due to a congenital abnormality of the gut (Meckel's diverticulum, diaphragmatic hernia, bands, or defect of the mesentery) giving rise to volvulus or strangulation. When no other cause is found for the attacks, a bismuth series is therefore indicated. Intussusception has not been referred to specifically, since although it occasionally occurs in older children and may be chronic, it is primarily a disease of infancy. When the pain is more frequent and unassociated with vomiting, the abdomen should be X-rayed and a Mantoux tuberculin test done to exclude tabes mesenterica. Although tuberculous abdominal glands can often be palpated if they are giving rise to symptoms, this is not always the case; also a mass of glands may easily cause confusion if situated in the right iliac fossa. When there is tuberculous peritonitis in addition, the distended, doughy or ascitic abdomen is characteristic, and is usually associated with considerable wasting and constitutional disturbance.

There remain the children in whom colic and digestive upsets—diarrhœa, constipation, anorexia or vomiting—are part of a general state of ill-health for which no satisfactory explanation except possibly upper respiratory infection is ever found. "All the investigations are negative" is a finding of little solace to the child, whose muddy complexion and furred tongue tell a different tale, and whose distended abdomen spells discomfort and wind. Unlike true cœliac disease, the condition is not characterized by bulky, glistening stools with a high fat-content, but commonly by the passage of considerable quantities of mucus, and not infrequently threadworms are harboured by the unhappy bowel. There is no blood in the stools, or evidence of chronic bacillary dysenteric infection.

In other cases, colic alone is the outstanding symptom, occurring after meals and being relieved by pressure on the abdomen or the passage of a stool. The condition has been compared to lienteric diarrhœa, and in many cases has almost certainly a nervous origin.

There is no single *treatment* of colic, least of all the popular one of castor oil. A purge should only be given in those cases in which a surgical condition can be confidently excluded; in doubtful cases an enema is safer, but here again extreme gentleness is essential. Prompt operation is indicated once a diagnosis of appendicitis or obstruction has been made though, if vomiting has been prolonged and has given rise to dehydration and ketosis, it is always advisable to prepare the child with injections of subcutaneous saline and 10 per cent. glucose intravenously. Abdominal tuberculosis is probably best treated medically, though recovery is often rapid after laparotomy in the ascitic type of peritonitis, and when caseous glands are found at operation it is sometimes possible to remove a small, isolated group satisfactorily; if the disease is more extensive they are best left alone.

In other cases of *severe* recurrent colic, when the renal tract cannot be incriminated and there is associated abdominal tenderness, it will probably be felt that an exploratory laparotomy is justified. This may lead to the removal of a certain number of normal appendices, but it will also show a considerable number in which there is evidence of previous acute attacks, or a congenital abnormality of the gut may be brought to light.

The children with chronic intestinal indigestion or post-prandial colic of nervous origin can usually be distinguished by the milder nature of the colic, the history, e.g. relief of colic by defæcation or passage of flatus, and the character of the stools. In both cases, the child's attention should as far as possible be directed away from his bowels, and any focus of infection likely to be interfering with the general health attended to. Meals should be eaten slowly in a quiet atmosphere, and after the mid-day dinner the child should lie down for half an hour. Too rigid dieting is undesirable, but in general a low roughage diet and no eating between meals, with the exception of a sweetened drink or biscuit at 11 a.m., should be ordered, and all meals should be plain and well cooked. Mist. rhei cum soda may be given three times a day before meals and, if worms are present in the stools, a dose of calomel followed by rectal wash-outs with saline or infusion of quassia each morning for a week should be given. Fresh air and a reasonable amount of exercise are invaluable, and for the hypotonic child with distension, abdominal massage or specific exercises should be instituted.

THE INDICATIONS AND TECHNIQUE OF PLEURAL ASPIRATION

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WHEN an effusion forms in the pleural cavity a sample of the liquid should always be removed for examination. This will often prove a valuable guide to the cause of the condition for treatment is largely dependent on the cause and on the nature of the liquid. When the effusion is a transudate secondary to cardiac disease, aspiration of ten or more ounces is indicated as the effusion throws a great strain upon the heart. In renal disease the effusion is usually bilateral, and if it is large enough to cause dyspnœa aspiration should be performed. In cases of new growth the effusion is usually the result of associated pleurisy and is often blood-stained. Aspiration is needed only to relieve dyspnœa. Endothelioma of the pleura leads to a large effusion which rapidly reforms so that repeated aspiration is required.

If the sample of liquid is found to be purulent the treatment depends upon the underlying condition. Empyema is commonly found as a result of (1) pneumococcal pneumonia; (2) streptococcal bronchopneumonia; or (3) rupture of a pulmonary lesion, such as carcinoma, abscess or bronchiectasis, into the lung.

In the case of pneumococcal pneumonia the empyema occurs after the crisis so that the patient is no longer battling with toxæmia due to the pneumonia and the pus is surrounded by adhesions and is in effect a local abscess. Empyema associated with bronchopneumonia occurs early in the disease, when the toxæmia is at its height and the pus is free in the pleural cavity so that the condition really is pyothorax.

In the first case the pus is thick and creamy and should be treated by rib resection and drainage. Recovery is the rule, but if superficial healing takes place before the whole of the empyema is closed the remaining pocket is apt to become a chronic empyema which fills with pus and periodically breaks either through the skin or into the lung. These chronic cases may be extremely troublesome and, although they are rare, it is most important to try to avoid them by repeatedly washing out the pleural cavity after the original operation and by keeping the tube in the empyema cavity until it has completely healed.

Treatment of the streptococcal empyema is entirely different. The pus is thin like cloudy water, there are no adhesions, so that rib resection and drainage would lead to an open pyothorax with a flapping mediastinum. The treatment therefore is to aspirate and this is usually necessary two or three times at intervals of about five days. In rare cases healing takes place by aspiration alone, but generally the pus becomes thicker and thicker, adhesions form, and rib resection and drainage become indicated. The operation is safe when once the liquid has turned into thick frank pus, for by this time adhesions will have developed.

When the empyema is the result of a ruptured abscess or a similar condition, the pus is extremely offensive and drainage is essential. Except in the malignant cases the result is often very good even when the patient appears desperately ill and the pus very offensive.

The cases which have been described are not, however, the usual cases of pleural effusion commonly seen by the practitioner. In the ordinary case the patient complains of malaise and a pain in the side. On examination he is found to have pyrexia and a pleuritic rub can often be heard. Later signs of an effusion develop and if left alone this usually absorbs, the temperature falls, and in some six or eight weeks the patient appears to be quite well again. Sometimes, and especially during an influenza epidemic, the liquid is found to contain an excess of polymorphonuclear cells but to be clear and to heal by simple medical methods, or even if left alone, although it may lead to empyema. Bilateral effusion may form and samples show the liquid to be clear, with a predominence of polymorphonuclear cells, and yet unaided recovery takes place. These effusions appear to be influenzal, but they are rare and it cannot be emphasized too strongly that the ordinary clear effusion starting in this way are tuberculous.

The tuberculous effusion is clear light yellow liquid and the cells are mostly lymphocytes. When a so-called idiopathic effusion occurs, starting with malaise or a simple pleurisy, it should be regarded as tuberculous and not as the result of injury, exposure to cold, rheumatism or other causes. Cold, injury, or privation may precipitate pleurisy, but do not cause it in a non-tuberculous subject.

There is considerable difference of opinion whether or not aspiration is indicated in these cases. Those who advocate aspiration think that healing is quicker if the chest is dry, and also that if an effusion is left too long and does not absorb, it may lead to thickening of the pleura and later to a considerable degree of fibrosis in the lung. On the other hand, aspiration of a large quantity of the effusion leads to sudden re-expansion of lung and the opening up of any tuberculous lesions which may exist in the collapsed lung. It must be remembered that the pleura is infected from the lung so that in the case of tuberculous pleural effusions a primary tuberculous focus in the lungs can be assumed, although it is not necessarily active. This is the chief reason why it is usual to leave a tuberculous effusion to absorb naturally unless (*a*) there is serious dyspnœa; (*b*) the effusion increases or shows no signs of absorption after eight weeks. If, in addition to the effusion, the pyrexia persists, aspiration is still more definitely indicated, but in this case the possibility of an active pulmonary lesion should be borne in mind; (*c*) if there is an active tuberculous lesion in the underlying lung aspiration should be performed and the liquid replaced by air in order to create and maintain a pneumothorax. If the liquid is allowed to absorb naturally the visceral and parietal pleura becomes adherent in the majority of cases, so that if any activity develops in the lung and necessitates some method of mechanical collapse pneumothorax is impossible and the patient is faced with the danger and mutilation of thoracoplasty. In some countries air replacement is advised in all cases of tuberculous effusion, and it is claimed that by this means the risk of subsequent activity developing in the lungs is considerably lessened. Artificial pneumothorax once started should be kept up for three or more years and so the patient is faced with a long course of treatment. Moreover, there are some complications of pneumothorax though they are admittedly rare. Since most patients with tuberculous effusion make a complete recovery and have no subsequent activity in the lung tissue provided they are given a long and thorough course of convalescence, air replacement and subsequent pneumothorax treatment is not performed as a routine in most clinics. Whether aspiration is advocated or not it is generally agreed that whenever possible it should be avoided until the acute initial stages of the pleurisy have passed.

TECHNIQUE OF ASPIRATION

The site of election of aspiration is the fifth or sixth intercostal space in the mid-axillary line. Here the ribs are furthest apart so that there is less likelihood of touching them with the needle. The intercostal artery is well protected by the rib, but it is important to make certain that the aspirating needle is inserted between the ribs, and if it is introduced slowly through the tissues previously anæsthetized with novocaine, it is always possible to avoid striking a rib.

The patient should lie on the healthy side with the axilla uppermost. After cleansing the skin and painting it with tincture of iodine, 0·2 c.cm. of a 2 per cent. solution of novocaine is introduced through a no. 20 Record needle into the skin over the site selected for aspiration. This leaves a small bleb and renders the skin anæsthetic. Using the same small needle 2 c.cm. of the novocaine solution are now injected through the bleb into the subcutaneous tissue and right down to the parietal pleura; the last 0·5 c.cm. should be against the pleura itself. The needle should then be pushed through the pleura and a few drops of the liquid withdrawn. If the no. 20 needle is not long enough to reach the pleural cavity a slightly larger one should be used in order to get a sample because it is most important to make certain that an effusion is actually present before the large aspirating needle is introduced. Thickened pleura or neoplasm may resemble effusion so closely that exploration is the only way to make certain of the diagnosis. The patient should then be left for at least three minutes, after which time the skin and pleura will be quite insensitive to pain and aspiration may be performed.

The type of aspirator is of no great importance but a matter of individual choice. Potain's model is a popular one and consists of a bottle from which air can be withdrawn by a suction pump. The bottle is connected by a rubber tube with the aspirating needle in the pleural cavity and when the tap is turned on the liquid is aspirated from the chest into the vacuum of the bottle.

With this apparatus it is possible to aspirate a large quantity of liquid quickly, but it is rarely advisable to aspirate quickly and although the rate of flow can be controlled by using the tap, I prefer to use a syringe, such as Dieulafoy's, which has a two-way cock. The syringe shown in the illustration has three nozzles and by turning the handle it can be connected with any one of these. It is possible to withdraw a quantity of liquid from the chest through one nozzle, turn the handle and expel the contents of the syringe into a flask through a second. The third nozzle is useful if the pleural cavity is to be washed

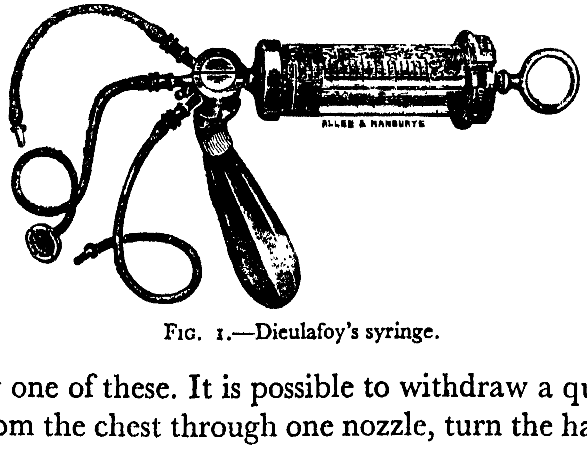

FIG. 1.—Dieulafoy's syringe.

out, as Dakin's, methylene blue, or any other solution can be drawn up through this into the syringe and after turning the handle the piston is pushed down and the contents of the syringe are injected into the chest. Thus the chest can be washed out and aspirated through one needle.

If it is decided to aspirate a tuberculous effusion on account of dyspnœa or the continuance of pyrexia or failure of the liquid to absorb, it is usually sufficient to remove ten ounces. This is not enough to produce much opening up of the lung tissue, with the risk of activating a tuberculous focus, but will generally relieve the symptoms. If the effusion reforms or is so large that it is necessary to remove more than ten ounces, it is safer to replace some of the liquid with gas, using air if it is decided to maintain a pneumothorax and oxygen if the gas is intended merely to prevent rapid expansion of the lung. Oxygen is absorbed more quickly, whereas if air is used complete absorption is often extremely slow so that a small hydropneumothorax may remain for months.

TECHNIQUE OF GAS REPLACEMENT

(1) *With one needle.*—The patient lies on the healthy side as for an ordinary aspiration, the site of the operation is the same and the skin and pleura are anæsthetized with novocaine as described. In this case, however, the aspirating needle has a two-way cock with two nozzles, one of which is attached to the aspirating syringe and the other to the pneumothorax apparatus. After aspirating some 500 c.cm. of the liquid the needle is connected with the pneumothorax apparatus and 300 c.cm. of gas are introduced. This produces an air bubble so that in order to aspirate more liquid it is usually necessary to turn the patient on his back or to make him sit up. As much liquid as required is removed and from time to time during the procedure gas is introduced. The end pressure should be left slightly below atmospheric such as −5 −2, and it is usually necessary to introduce about 300 c.cm. of gas for every 500 c.cm. of liquid removed. When a large quantity of liquid is aspirated the patient is apt to feel dizzy and may

actually faint, but these symptoms are due to lowering of the intrathoracic pressure and are at once relieved by introducing a small quantity of gas.

(2) *With two needles.*—The skin over the fifth intercostal space is cleaned and anæsthetized with novocaine and the needle is then pushed down to anæsthetize the pleura as in an ordinary case of aspiration. The skin over the seventh space just below the angle of the scapula is then cleaned and 0·2 c.cm. of the novocaine solution is injected intradermally to produce a small bleb. Two c.cm. of the solution are then drawn into the syringe and using the same small needle the subcutaneous tissue and pleura under the bleb are anæsthetized and the needle is then pushed through the parietal pleura and a few drops of liquid withdrawn to make certain that an effusion is actually present at that spot.

With the patient lying on the healthy side a needle connected with a pneumothorax apparatus is inserted through the anæsthetized area in the axilla into the pleural cavity and the air or oxygen allowed slowly to flow in. A second needle connected with an aspirating apparatus is then inserted through the anæsthetized area in the back into the pleural cavity and aspiration is carried on at the same time as the gas is entering the pleural cavity through the axilla. By regulating the rate of aspiration and of the introduction of the air it is possible to keep the intrapleural pressure constant throughout the proceedure.

TECHNIQUE OF GAS REPLACEMENT AND PLEURAL IRRIGATION

In order to do this I introduce gas into the pleural cavity through the axilla in exactly the same way as in ordinary gas replacement. Through the anæsthetized skin at the back I then insert the aspirating needle connected with the three-nozzled syringe shown in the illustration. A syringeful of effusion is aspirated into the syringe and expelled through the second nozzle into a receptacle, the syringe is then connected with the third nozzle and filled with the solution to be used for irrigation. The syringe is then again connected with the first nozzle and the solution injected into the pleural cavity. More of the effusion is aspirated and the procedure continued as long as required. It is usual to use about two pints of the solution for washing out the pleural cavity. During the aspiration gas is allowed to enter through the pneumothorax needle care being taken to regulate its rate of entry so that the pressure remains slightly negative. In the case of pyopneumothorax when the object of the procedure is to cleanse the pleural cavity and encourage the re-expansion of the lung, oxygen should be used instead of air, a low intrapleural pressure such as −15 −8 should be left and as much of the effusion as possible aspirated each time. Some prefer to introduce the irrigating solution through the axilla and in this case aspiration is performed in the ordinary way through the needle in the back. The pneumothorax needle, however, has two nozzles, one connected with the pneumothorax apparatus and the other by a long rubber tube with a funnel. After aspirating some of the effusion and introducing some gas into the pleural cavity to form a bubble in the axilla, because it is uppermost, the needle is cut off from the pneumothorax apparatus and connected with the funnel through which the irrigating solution is poured. The principle is the same in both cases and consists in the introduction of gas and irrigating solution and the removal of effusion and solution.

THE ODOUR AND COLOUR OF URINE IN HEALTH AND DISEASE

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IN these days of scientific diagnosis, there is a perhaps natural tendency to overrate the indications for the application of instruments of precision and the accessory aid supplied by the pathologist to the neglect of the unaided senses upon which our predecessors were so dependent. In certain branches of medicine the sense of hearing still holds pride of place ; the sense of touch is on general admission exceedingly fallacious, the sense of taste has naturally the most limited application. That of smell is in almost the same category, and observation, although influenced by training and deduction, is probably to a considerable extent an inborn characteristic. Such a theme as this is open to almost unlimited development; in the present instance it is intended merely to consider it in the superficial examination of the urine.

The odour of normal healthy urine is traditionally described as aromatic. I am rather dubious of the selection of this adjective as really embodying the actual smell of urine which, however platitudinous the term, may from its universal familiarity be described as " characteristic." Some variation is to be attributed to difference in concentration, occasionally to the presence of materials derived from the food and capable of imparting their own specific smell, e.g. the extractives of meat, asparagus, and garlic. Urine rapidly decomposes and after a short time an ammoniacal smell more or less intense produces the odour which is more generally recognizable as " urinous." Certain drugs, copaiba, santonin, and peppermint, medicinally administered may also be excreted by the kidneys and their presence olfactorily detected; turpentine is said to impart the smell of violets, a phenomenon of which I personally lack confirmation.

In disease it is sometimes possible to recognize the ripe-apple smell in diabetes; not so frequently to-day of course as in the past when untreated cases led to the severe acidosis which often permitted a diagnosis on entering the patient's bedroom as well as occasionally on smelling the urine. A somewhat similar smell may be observed in any condition of acidosis from whatever cause arising.

I have referred to the ammoniacal smell of normal urine decomposing : this is much more intense in certain forms of cystitis. The fishy smell associated with infection by *B. coli* is also unmistakable, but secondary and mixed infections may lead to a putrid or fæcal smell. The latter is also evident when a fistulous communication of the urinary tract is present with some part of the alimentary canal, most commonly the rectum.

THE COLOUR OF URINE

Normally, urine has a faint amber yellow colour due to urochrome but the colour varies considerably with concentration. Thus a concentrated urine, especially in summer, is considerably darker, and very light, almost colourless urine may be voided after the imbibition of large quantities of fluid as well as in the low specific gravity urine of diabetes insipidus and granular kidney.

Modification of colour will result from the following causes : (1) The presence of large quantities of urinary pigment—uroerythrin or hæmatoporphyrin. (2) The presence of pigment found in the organism but not normally excreted in the urine—hæmoglobin and bile pigments. (3) The presence of pigment adventitiously introduced from drugs or food.

The colours which may be encountered are yellow, pink, red, brown, black, green or blue, and, rarely, milky white. A rich orange yellow colour, due to urobilin, occurs in hæmolytic diseases, e.g. pernicious anæmia. It may also occur in some intestinal disturbances as the result of bacterial changes and in cirrhosis of the liver.

Uroerythrin, associated with "pink urates," is of interest chiefly because it is usually identified by the patient and, I fear too, sometimes by careless doctors as blood. It is of no particular significance ; almost any hepatic disturbance can be responsible for its appearance but it is most commonly encountered in passive congestion, e.g. decompensated morbus cordis.

Bile in the urine may be responsible for a number of colours, usually green or orange, but sometimes, if very intense, almost black. The variation depends upon the relative amounts of bilirubin and biliverdin. In most cases there is a peculiar sheen which immediately suggests the presence of bile.

Pink or red urine.—The suspicion of blood pigments almost immediately arises when a red colour of the urine is present. The possibility that uroerythrin may be responsible has already been mentioned, and there are a few additional opportunities for mistake, although, in the large majority of cases, hæmoglobin is the cause. Hæmaturia must be distinguished from hæmoglobinuria. The former necessarily connotes a recognition of red blood corpuscles; in hæmoglobinuria the presence of blood pigment alone is responsible. It is unnecessary here to enumerate the large number of causes of blood in the urine, but hæmoglobinuria deserves a few words. To the experienced eye the urine in a case of hæmoglobinuria looks different from that in which blood is mixed with urine, and on dilution the difference is more evident. Furthermore, filtration perceptibly diminishes the colour in the case of hæmaturia but not of a urine in which hæmoglobin alone is present. The microscope is, of course, the distinguishing test, chemical reactions and the spectroscopic peculiarities are due to the blood pigment alone and, therefore, common to both hæmoglobinuria and hæmaturia.

Hæmoglobinuria which is due to the destruction of red corpuscles within the blood vessels may be caused by certain poisons, e.g. potassium chlorate, turpentine, and by gases—carbon monoxide and sulphuretted hydrogen. Transfusion of foreign sera may be responsible and snake venom may be mentioned in this category together with blackwater fever, the exact etiology of which is uncertain. Henoch's purpura is another pathological state in which it has been noted.

Hæmoglobinuria is of particular interest in the condition known as paroxysmal hæmoglobinuria, which may be induced in susceptible persons through exposure to cold. In many such subjects the Wassermann reaction has been found to be positive so that syphilis plays a frequent though not an essential part. The rarer condition of hæmatoporphyrinuria, which may be produced by the ingestion of sulphonal and by other less well known causes, is, according to the late Sir Archibald Garrod, more common in women.

More innocent causes of pink urine are attributable to aniline dyes such as rosaniline, which at one time had some therapeutic application, and eosin, which is employed in the tinting of inexpensive boiled sweets and may impart a pink fluorescent coloration to the urine. Chrysophanic acid from rhubarb and senna medicinally administered will colour the urine pink if it is alkaline ; a few drops of acid change the colour to yellow.

Black urine.—The urine in intense jaundice and in some cases of hæmaturia or hæmoglobinuria may be so dark as almost to be regarded as black ; but the darkly coloured urines legitimately considered in this section comprise those in which a urine of normal colour when freshly passed becomes black on standing and those which are black when passed, the result of the ingestion of certain drugs, particularly carbolic acid, the salicylates, gallic acid, and resorcin. Melanuria may occur in melanotic sarcoma from the presence of a colourless chromogen which oxidizes to melanin but only if the liver is the seat of such melanotic deposits. In alkaptonuria, the urine similarly darkens on standing. This is a rare inborn error of metabolism and the phenomenon is attributable to homogentisic acid, a substance which incidentally has a reducing action upon Fehling's solution.

Indicanuria is the result of protein decomposition in the alimentary canal, the intensity of the coloration depends upon the particular oxidation products of indol which may be formed.

After the ingestion of carbolic acid, oxidation products, pyrocatechin and hydroquinone impart a dark colour which intensifies on further exposure to the air. Even external absorption from surgical dressings may produce this result.

Green urine is familiar in jaundice, and a green coloration merging into blue occurs after the administration of methylene blue medicinally, or when sweets have been coloured by this or a similar aniline dye. Milky urine due to admixture with chyle occurs in filariasis.

ERYTHEMA NODOSUM

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THE etiology of erythema nodosum has been disputed for two generations. In 1869 Trousseau[1] described it as a specific and separate disease, though admitting that leading authorities had pointed out the mutual relations of rheumatism and erythema nodosum. He also quoted Hardy as holding the view that certain chronic cases, which may ulcerate, depend on a scrofulous taint. Here are set out the three main theories of the etiology of erythema nodosum as they are discussed to-day, namely the specific, rheumatic, and tuberculous theories. The object of the present article is to review the evidence for each of these views, and to submit the details of a series of forty adult cases personally observed at Withington Hospital.

INCIDENCE OF AGE, SEX, AND SEASON

Age may be an important etiological factor; it certainly appears to play a part in the experience, and therefore in the conclusions, of individual observers.

The majority of Mackenzie's[2] cases occurred in adults; Symes[5, 11] found it to be essentially a disease of youth and adolescence; Gosse[6] considered it to be a disease of childhood. Of Wiborg's[7] thirty cases, twenty-six were under fifteen years of age. Lendon[9] found 89 of 124 cases to be adults. The cases reported by Collis[18] were all children. The evidence of Landau[10] is based on epidemics observed among school children. Cruise[17] reported thirty-three cases occurring in young adults.

The forty cases now recorded all occurred in adults. A study of reported cases shows an apparent connection between age incidence and theories of etiology. Of supporters of the specific infection theory, Lendon and Symes found the large majority of their cases in adults, whereas Gosse dealt solely with children. Mackenzie's and my series, evidence from which is in favour of the rheumatic theory, are based on observations, the former mainly, and the latter wholly, on adults. Those who support the tuberculous theory have dealt, more often than not, only with children.

Sex appears to play a larger part in adults than in children.

Lendon found eighty-five females and four males in his adult series; before puberty the figures were seventeen females and eighteen males. In Mackenzie's series of 108 cases, mostly adults, there were ninety females and eighteen males. The proportion given by Symes was 3·3 to 1.

Of the forty adults in my series, thirty-eight were women. Gosse found the sexes in childhood about equally affected. Landau's figures were obtained from observations on schoolgirls. Collis[16] made his observations on eight female children; in his later figures the sex is not stated. The observations of Cruise were confined to female hospital nurses, whose average age was twenty-two years. Of the eighteen cases described by McKinnon[23] fifteen were adults, of whom fourteen were women.

Lendon concluded that the influence of *season* was slight; such figures as are available appear to prove it negligible.

Mackenzie found the maximum incidence to be in June, Symes in March–April; Gosse found the incidence highest in May and low in November; the present series gives equal maximum figures for April and November. Four observers have recorded their figures for each quarter of the year (references[2, 9, 11] and the present writer); none of them individually show any well-marked seasonal preponderance, and if all the figures are totalled the quarterly incidence for 458 cases is seen to be 108, 124, 98 and 128.

These figures provide no argument for or against any theory of the etiology of this condition.

THE SPECIFIC THEORY

In 1869 Trousseau put forward the view that erythema nodosum was a specific and separate disease. He pointed out that general symptoms almost always precede the eruption. In 1890 Lendon[3] considered it to be an acute specific infectious disease although only a variety of erythema multiforme. In his book[4] published in 1905, and again in 1925, he adhered to the specific theory, using the terms erythema nodosum and erythema multiforme as synonyms for nodal fever. He described a prodromal stage, a stage of eruption, a stage of convalescence, relapses, and second attacks. Yet in 1925 he wrote that he had had no personal experience of epidemics of nodal fever. His first forty-one cases occurred in thirty-four different families; his observations suggested an incubation period of eleven days. Symes favoured the specific theory in 1907, and in 1928 published his book, " Erythema Nodosum," in which he attempted to demonstrate it as a distinct clinical entity. He gives instances suggesting contagion, but admits that they were capable of explanation by a common source of toxæmia. Symes suggested fourteen days as the incubation period, and quoted outbreaks of the disease reported by others. In favour of his view he refers to the incidence of age, sex, season, and symptoms, to the occurrence of epidemics, and to the rarity of recurrences. Gosse could see no argument against the specific theory; Collis severely criticized it. Wallgren, quoted by Landau,[14] found a tuberculous source of infection in every one of six family endemics and one school endemic; he considered that this evidence negatives the specific theory.

THE TUBERCULOUS THEORY

Reference has already been made to the fact that exponents of the tuberculous theory, with few exceptions, have drawn their evidence from children. Landau in 1932 wrote that

> " It is widely, though not universally, accepted that most cases of erythema nodosum in children are connected with tuberculous infection. The frequency of positive tuberculin reactions in children with erythema nodosum almost reaches one hundred per cent."

Watt and Stubbs[8] described two cases of erythema nodosum in boys who showed extensive pulmonary tuberculosis, one of whom died of meningitis. They quote Ernberg (Copenhagen, 1919) who found that of 31 children examined several years after they had had erythema nodosum, thirteen had developed evidence of tuberculosis, most of them during the first year after erythema nodosum. In another series of thirty-nine cases of erythema nodosum, Ernberg found radiological evidence of active pulmonary tuberculosis in thirty-five. Saxl[13] concluded that in an overwhelming majority of cases erythema nodosum is a symptom of tuberculosis. Landau described an endemic of four cases in a class of thirty-one girls aged eleven to twelve; one apparently healthy girl had cavitation of the lungs with tubercle bacilli in the sputum; she had refused to stay away from school when she had a " cold " and did much coughing four to six weeks before the four cases of erythema nodosum occurred simultaneously. He concluded that erythema nodosum appears at the end of the incubation period of tuberculosis, which he took to be three to seven weeks, and suggested that the appearance of erythema nodosum in a group of children called for a thorough search for a case of active and contagious tuberculosis. The conclusions to be drawn from the small outbreak reported by Begg[15] are not clear. In a ward of twelve children exposed for five weeks to infection from one of their number who died of miliary tuberculosis, four of the children developed erythema nodosum; these four all gave positive Mantoux tests, and all had radiological shadows suggesting hilar gland tuberculosis. But each of the four also gave a positive reaction to streptococcal toxin (Dick); three of them had complained of sore throat, and from one throat streptococci were grown. The series of eight cases in children, all girls, reported by Collis carried the problem of etiology a step further in a convincing manner. In five of the cases the evidence that they were tuberculous amounted almost to proof; four of them (two being sisters) had a mother suffering from active pulmonary tuberculosis, and the other lived with an aunt similarly affected; all five gave a positive Mantoux test; four had radiological evidence of tuberculosis; four gave negative throat cultures, and from three of them the material obtained by gastric lavage gave positive results for tuberculosis when inoculated into guinea-pigs. His other three cases provided equally convincing evidence that the etiological factor was a streptococcus. They were isolated cases; they were not exposed to tuberculosis, and all three yielded streptococci on cultures made from the throat. Collis suggested from these facts that erythema nodosum is a type of hypersensitive tissue response to different bacterial allergens. In a later publication on reviewing forty-nine cases, he considered thirty-seven as tuberculous, and eight as rheumatic (streptococcal), four being unclassified. Symes[19], although he had persistently maintained that erythema nodosum was a definite specific fever, was so impressed by the evidence for the relationship of erythema nodosum to tuberculosis that he frankly described erythema nodosum as an early symptom of tuberculosis. In a study of thirty-three cases of erythema nodosum occurring in female hospital nurses, Cruise found ten developed it within an average of eight weeks from the time of their starting work in an institution for the treatment of tuberculosis; thirteen had erythema nodosum before such training, and ten after it. Of the thirty-three, seven developed definite pulmonary tuberculosis within two years of having had erythema nodosum. Similar findings are reported from Denmark by Holmes[20] where erythema nodosum was found to occur almost as frequently as pleurisy in the contacts of pulmonary tuberculosis; 22·1 per cent. of nurses at the Frederiksberg Hospital developed one or other of these conditions within seven months of exposure to infection. Forman and Whitwell[21] in their study of fifty cases, reject the rheumatic theory, and suggest that in most cases of adult erythema nodosum a recent re-infection with the tubercle bacillus has occurred; symptoms of active rheumatism did not occur in any of their cases at the time of the nodes.

THE RHEUMATIC THEORY

Trousseau wrote that although the pain was sometimes as acute as in pure rheumatism, he had never seen redness or swelling in the situation of the affected parts, nor had he ever found signs of a cardiac lesion.

Among 108 cases collected from the records of four London hospitals, Mackenzie found pain and swelling of joints mentioned in seventeen instances, and pain alone in seventeen others; ten of these thirty-four showed some heart lesion, and thirteen others had some heart affection; five of them developed a bruit during the illness, and one developed acute pericarditis with effusion. He felt the inference to be justified that erythema nodosum was frequently, if not generally, an expression of rheumatism. In his book Symes stated that by far the commonest symptom was tonsillitis; he refers to four sisters who had erythema nodosum over a period of twenty-six years, usually accompanied by tonsillitis, whose parents were both rheumatic, and whose mother also suffered from erythema nodosum. One of his patients had seven attacks of erythema nodosum between the ages of eighteen and thirty-seven; in 14·4 per cent. of his cases there were objective signs of arthritis; the relief from salicylates was sometimes prompt and lasting. The paper by Gosse combated the rheumatic theory, but an analysis of his figures seems to favour it, for forty-eight of his hundred cases had one or more of the symptoms arthritis, tonsillitis, or chorea, and only nineteen of the whole series were without one or more of his own list of manifestations of rheumatism; the illness frequently began with tonsillitis. Wiborg described thirty cases occurring in nine months, eighteen of them in December, which he considered to be rheumatic; he found salicylates effective. In his first series of eight cases Collis found that three were streptococcal; in his later paper dealing with a total of forty-nine cases he found only 18·4 per cent. in London and 9·1 per cent. in Dublin to be streptococcal (rheumatic). Slot[22] treated three adult females with antistreptococcal serum; they all had sore throats a few days before the eruption; one gave a history of rheumatic fever, the other two had arthritis at the time of the eruption; they all responded rapidly to the serum. McKinnon[23] found that ten out of fifteen in his adult series had a rheumatic diathesis.

Many writers have noted recurrences both in children and in adults, while the records of epidemics are very few indeed. These observations favour a rheumatic etiology.

AUTHOR'S SERIES

The series of forty cases now reported was observed over eight years in a large municipal hospital admitting only adults. There were thirty-eight females, and two males. The youngest patient was nineteen, and the oldest sixty-nine. The fourth decade accounted for thirteen cases, the third for twelve, and the fifth for nine, the average age being thirty-five years. None of the patients gave a previous history of tuberculosis. One patient developed a pleural effusion four months later; she showed radiological evidence of hilar gland affection; the pleural fluid gave a negative result after inoculation into a guinea-pig. There was a previous history of rheumatism in fifteen cases, and of tonsillitis in sixteen cases; eight of these overlapped, so that twenty-three of the forty cases gave a previous history of rheumatism or tonsillitis, or both. Included in these twenty-three are two patients who had suffered from chorea, and three who had previously had erythema nodosum, one of them twice. Concurrent with erythema nodosum, there were twenty-six instances of rheumatism and twenty-two of tonsillitis; fifteen of these overlapped, giving thirty-three cases of rheumatism, or tonsillitis or both. Four other patients complained of pains in the limbs; seven of the thirty had evidence of endocarditis, but in none could this be held to have developed during the illness. In this series, twenty-six of the cases, or 65 per cent., gave evidence of more than one of the generally accepted manifestations of rheumatism, either in their previous history or concurrently with erythema nodosum.

TREATMENT

The nodes, which may appear in successive crops, are usually painful for several days and may be tender even to the touch of the bed clothes. All pain and tenderness disappear long before the nodes have faded into what seems to be the last stages of a bruise. Treatment is directed towards the relief of pain. The patient should be in bed with a cradle to support the clothes. Local applications such as lead and opium lotion, glycerin and belladonna, or fomentations sprinkled with tincture of opium, give considerable relief. When pain prevents sleep in spite of these measures, morphine hypodermically, or an opiate such as nepenthe or Dover's powder by mouth, is justified. Saline aperients and full doses of salicylates should be given to those cases with a history of rheumatism or with coincident manifestations of rheumatism. The patient ought to be kept in bed for several days after all pain and pyrexia have subsided.

SUMMARY AND CONCLUSIONS

The facts relating to the etiology of erythema nodosum as recorded by various observers, and their deductions from these facts, are reviewed. The theory that it is an acute specific disease, to be classed with the exanthems, is untenable. The evidence amounts to proof that in children both streptococcal and tuberculous infections may produce erythema nodosum; tuberculosis is the more frequent factor. In adults the great majority of cases are due to rheumatism, the remainder to tuberculosis. A series of forty cases in adults is reported, of which number thirty-eight were in women; no explanation is forthcoming of this sex preponderance in adults. Undeniable evidence of rheumatism was present in 65 per cent. of the cases, while in most of the others the associated history and symptoms made rheumatism the most probable cause.

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HEAD INJURIES

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THE title of " head injuries " should involve consideration of a range of conditions from simple injury of the scalp, extending through stages of widening severity, to major destruction of that all-important structure, the brain. In this review the primary intent is to deal with lesions affecting the brain and its membranous and osseous covering, omitting details regarding the superficial tissues.

In the immediate past discussion of major head injuries has directed its path along the lines of significance of fractures of the skull, but the relative unimportance of the bone in comparison with the cranial contents is now realized. Dissolution of bony continuity in the skull, however, still acts in the minds of members of the legal profession as a centre in the estimation of damage and the assessment of adequate compensation. It must be remembered that the relative degrees of injury to bone and brain bear no common ratio, so much so that a fatal termination may ensue in consequence of cerebral damage, in the absence of bony injury, or wound of the scalp of even minor significance. In other words, the presence of cerebral injury does not demand the presence of a fracture of the skull, and what is more, need not be associated with objective physical signs. It is likewise fallacious to accept the dictum that bony injury does not result from an injury in which laceration of the scalp is absent. Force dispelled in the production of bony injury may well spare more serious damage to the brain, and the resultant bony injury, therefore, may be to the patient's immediate advantage. An estimate of the parts involved and the extent of the damage may be deduced only after observation of a case over a period of time, comparing relative states of the patient in respect of several examinations.

TYPE OF LESIONS

Fractures of the skull may be classified in general terms as simple or compound, complete or incomplete, but in practice more concern arises from site and direction, that is to say, whether the lesion is of the vault or calvarium, or alternatively, the base of the skull. The significance of this lies in the fact that the majority of basal fractures are compound. Fractures of the skull, as a whole, are liable to open up pathways for the transmission of infection, the possible production of dural or vascular lacerations, and their association with other underlying or subjacent injuries. Although fractures of the vault may be due to localized trauma, those of the base are consequent on the application of massive force. It is by no means essential for a fractured base to depend on a blow aimed directly at the head: such injuries may result from a fall in which the patient lands on his feet, the force being transmitted along the spinal column to the condyles of the skull, a fracture into the posterior fossa being the outcome.

All compound fractures demand prompt and careful treatment as the risk of spreading infection, with consequent septic meningitis or cerebral abscess, is ever present. Compound fractures are more likely to receive attention, when recognized; but the fact must not be overlooked that for a fracture to be compound depends not on an association with scalp wounds alone, for the lesion may communicate with the nose or nasal sinuses, the middle ear, the external auditory meatus, or the pharynx. Of such possible sites, injuries involving the anterior fossa, affecting the cribriform plate of the ethmoid, are the most serious, as here arises the risk of a cerebrospinal fistula and a yet greater risk of meningitis. When damage of this character occurs cerebrospinal rhinorrhœa may be the consequence, owing to implication of the ventricular system. Meningitis in such circumstances must be considered to be inevitable, unless satisfactory operative treatment is available, though the onset may be delayed for a considerable time, being induced by any later catarrhal or influenzal affection of the nasal mucosa.

Brain abscess is not a common sequel to head injury, though it is more particularly inclined to supervene on fractures in communication with the ear. The diagnosis of an abscess depends on the recognition of the development of signs of increasing intracranial pressure, such as headache and vomiting, together with signs indicating the presence of an extending focal lesion of the brain, in the absence of hæmorrhage in some form. Unless careful residual states are noted when the initial damage has been repaired, difficulties arise in the determination of the actual site of abscess formation. The association of cerebral abscess with a normal or subnormal temperature does not seem to be common knowledge. Rise of temperature indicates involvement of meninges, or implication of the ventricle.

Paralysis of one or of several cranial nerves may arise in consequence of fracture of the base of the skull. The optic and facial nerves are particularly prone to damage in this way.

Vascular lesions in the form of arteriovenous aneurysms sometimes result from basal injuries, but gross injury is by no means essential in the production of these conditions. The diagnosis will depend on the development of bruits audible over areas varying according to the site of the lesion, together with pulsating exophthalmos, or dilated vascular channels involving scalp vessels in communication with the intracranial sinuses. The bruit is frequently audible to the patient, in fact the discomfort arising therefrom is often responsible for the attendance of the patient. The murmur audible to the patient at each beat of the pulse causes great distress and may even make him suicidal.

Depressed fractures gain relative significance according to site. When unrelated to overlying wounds they are important by virtue of the underlying brain, but are of less concern when situated over "silent zones" of the cerebral cortex.

VASCULAR INJURIES

Injuries to vascular structures form important developments consequent on trauma to the head, and they may arise in different ways according to the vessels involved. Laceration of vascular structures may take place within the bone, at the junction of osseous and dural segments, within the dura, also in vessels of communication between dural sinuses and cortical veins, those traversing the subarachnoid space, and those within the brain or ventricles of the brain. As the focus of bleeding varies so do the signs exhibited therewith, and also the time relationship of onset, dating from the time of impact.

Laceration of a vessel running a combined osseous and dural course, as in the case of the middle-meningeal artery, may originate from the presence of a simple fissured fracture. In these circumstances the dura is nipped between the reapposing lips of the fracture, consequent on the natural elasticity of the bone; or, perhaps, separation occurs at the junction of the bony and dural segments of the vessel. The resultant hæmatoma is located in an extra or epi-dural position. In a patient exhibiting this form of injury the coma of the concussive stage may merge into that of compression, but it is more frequent for an intervening period of regained consciousness to elapse prior to the onset of compressive signs, such period varying from a few hours up to twenty-four or even forty-eight hours. That interval between the initial recovery and the onset of signs of compression is referred to as the "lucid interval." Hæmorrhage from the middle meningeal, more commonly, is delayed in onset, the patient deteriorating after an interval of improvement, passing through stages of progressive paralysis, associated with increasing drowsiness to coma. The clinical picture of middle meningeal hæmorrhage is a typical one, though a rare complication of cranial injury: the patient, after a varying period of apparent recovery, gradually runs a downhill course, passing through stages of spasticity and flaccidity of the limbs, first of all on the contralateral side of the body, then affecting the ipso-lateral limbs. Comparable changes are demonstrable in the pupils in which contraction primarily takes place on the side of the lesion in virtue of oculo motor stimulation, later to be followed by dilatation as paralysis supervenes. The opposite pupil follows tardily in its wake, thus exhibting variations and differences in the sizes of the two pupils. At one stage the sizes of the pupils approximate, but their relative reactions to light enables one to deliberate as to the side of paralysis.

Laceration of communicating vessels running between dural sinuses and the cortex is a more common source of bleeding, but even its relative incidence is small. Rupture of vessels does not demand impact of excessive force, in fact in old people and more particularly mental defectives this form of injury may be produced by quite minor shakes of the head, as for instance when a jar is sustained in missing a step while dismounting a ladder. In younger people this same form of hæmorrhage is induced by more severe forms of trauma, but is more especially liable to occur from display of force in the form of a thrust or jolt, as is likely in car accidents. It is an interesting point that intermittent bleeding may occur with the ensuing formation of a multi-locular hæmatoma, but one envelope is much more common. Subdural hæmatoma, as this condition is designated, may not be limited to one side, in fact the possibility of bilateral lesions is by no means unusual. The onset of symptoms from a chronic subdural hæmatoma may be delayed for three or four months, or more, and then give rise to manifestations of general increase in pressure, rather than to focal, or even lateralizing signs. These patients change mentally, becoming dull and drowsy, inattentive, and frequently incontinent; they may become quite comatose, followed by regained consciousness, only to relapse into coma. Should the onset follow shortly on injury, subdural hæmorrhage will be suspected, but the delay in onset and frequently insignificant nature of the causative blow are factors in the failure to arrive at the correct diagnosis. The injury may be of so mild a character that, even with a patient able to co-operate contributing the history, there may be no mention of a blow, which apparently has been so trivial as to fail to attract notice. A peculiar intermittency in the patient's state may be considered to be one of the characteristics of the disease. In a recent case a relative stated that " one day he (the patient) would be like dying, and the next he would be as right as rain." The content of the sac of a subdural hæmatoma is of a thin, dirty, brown character, and does not strike one as consisting entirely of the products of hæmorrhage; so much so, that, this fact together with the peculiar delay in the onset of symptoms rather support the belief that some further agent takes part in the formation and expansion. The probability is that the sac acts as a dialysing membrane, with consequent seepage of cerebrospinal fluid through into the cavity. It is worthy of note that the formation of a chronic subdural hæmatoma may be associated with a normal intracranial pressure as determined by lumbar puncture. Symptoms may possibly be caused by collections of fluid in localized portions of the subdural space. Persistent localized headache has been found at operation to be associated with "subdural fluid," and relief has resulted after removal.

CONCUSSION, CONTUSION, LACERATION, IRRITATION

Cerebral injuries have long been described under the terms concussion, contusion and laceration, and cerebral irritation; yet, although it may be advantageous to refer to these specific terms individually, it should be realized that isolation of the lesion to any one particular group is impossible, as one state merges into another. Concussion is a state of depressed vitality depicted in temporary unconsciousness without leaving any further indication of cerebral injury. At the outset, in a typical case, all vital activity is abated, but recovery is soon apparent, usually heralded by vomiting, this latter physiological process being instrumental in the restoration of blood pressure and cerebral blood-supply. In its minor form this disturbance of cerebral function is exhibited in those cases of "automatism" in which persons continue their pursuits current at the time of injury though registering no recollection of the activities being carried out. By what *pathological process concussion is induced is unknown: some observers vaguely talk of "commotio cerebri," which is an* indeterminate expression. The most tenable explanation is that of Trotter, who suggests that the cranial deformity resultant on the blow produces acute compression of the cerebral blood-vessels with consequent ischæmia of the brain, this process being succeeded by capillary permeability with its sequel, œdema. To what extent these changes take place depends entirely on the amount of damage. Thus the later stages of œdema may not arise, in which circumstances recovery will be early and complete. Should œdema develop to accentuated limits, as occurs when more gross vascular damage or cerebral laceration is present, prolonged disturbances lasting upwards of twenty-four hours result. Lesions exhibiting symptoms after this period must be regarded as being more than concussive effects, and the damage should be assessed in terms of cerebral contusion, cerebral laceration, or the supervention of some further process as hæmorrhage from damaged vessels. Thus cerebral contusion or laceration draws attention to its presence by prolonged general effects together with signs of local cerebral injury, when affecting other than silent areas of the brain. Fatal results may take place in the absence of external damage; at autopsy such cases show contusion or laceration in the frontal, temporal, and occipital poles, together with hæmorrhagic changes in the brain stem. The mode of induction of these several injuries is of considerable interest. The brain may be damaged subjacent to the point of impact, but there is especial liability for injury of greater expanse at a place situate at the opposite end of the line of thrust, when the lesion is described as of "contrecoup" distribution. There is yet a further process by means of which traumatic effects may arise: this involves implication of the ventricular system, whereby a sudden generalized compression results in effort on the part of the ventricular walls to eject their contents, when, the means of egress being limited, acute distension of the iter results, with consequent disruption of adjacent structures.

Focal injuries may be defined by pathological signs and symptoms arising from interference with the physiological functions relegated to the parts involved. Hence an estimate of the volume of tissue destruction depends on observation over a period of time in order that data derived from several examinations may be available for comparison. Activity of the vital centres is observable in the pulse-rate, blood pressure, temperature, respiratory rhythm, and depth of unconsciousness. Hemispheral injury is shown by observation of the pupils, and the relative states of the limbs in terms of spasticity, flaccidity, and paralysis. The gauging of degrees of unconsciousness presents some difficulties but may be ascertained by attention to responses induced by the application of painful stimuli, optical stimuli, the reactions to repeated taking of pulse and temperature, the reaction to administration of fluids and food, verbal replies, and later the degree of orientation to surroundings and existence in general.

The state long known as one of "cerebral irritation" and depicted in the presence of stupor, irritability, restlessness and confusion, no longer claims the belief that therein lies its pathology. This condition is one of depressed activity of the higher centres with resultant lack of control, depicting a release phenomenon. This state, more accurately described as "traumatic delirium" is, in all probability, associated with venous stasis and congestion producing local anoxæmic changes in the affected parts.

PROGNOSIS

The important question of prognosis in a case of head injury presents much difficulty, and it cannot be determined with any vestige of accuracy from an isolated examination. Attention has been drawn throughout to the necessity for repeated examinations over considerable time in the estimation of damage, and, therefore, in the attempted gauging of the prospects of recovery. The duration of unconsciousness and the succeeding stages, together with the types of injury, are points of importance. The period of initial loss of consciousness is in direct proportion to the extent of cerebral damage, but the severity of the damage is little indication of the probable scope of troublesome sequelæ; more particularly is this noticeable in respect of those conditions labelled under "traumatic neurasthenia." The prognosis is always clouded with uncertainty in view of possible secondary changes, but in the more severe cases those living after twenty-four hours have a much greater chance of recovery, eighty per cent. of fatal cases terminating in that period. Patients alive forty-eight hours after injury may be looked upon as having a reasonable chance of recovery in the absence of supervening complications. Early secondary changes such as deepening unconsciousness, stupor, are evidences of supervening pressure, and exclusion of hæmorrhage is all-important. Should a patient remain in a deeply comatose state with a pulse of low pressure and rapid rate for more than one hour the prognosis is very bad. When a patient regains consciousness but maintains a low temperature anxiety continues, more especially if there is a co-existent weakness of the pulse; concurrent development of high temperatures also bears serious significance. The longer a patient lives, however, in spite of delayed return from stupor, the better the chance of recovery provided that hæmorrhage or infection does not develop.

Concussion is characterized by a tendency to spontaneous recovery, and the postponement of such recovery declares the presence of a more profound form of injury. The return of function travels from lower to higher centres. Beginning with the vital centres, it passes through stages of inco-ordinated movements, co-ordinated movements, awaredness and orientation as regards surroundings, and finally registration of memory. The length of the period of pre-traumatic amnesia gives a relative impression of the extent of the injury sustained; but it should be realized that this space of time tends to lessen as the patient progresses.

Delayed phenomena do not appear in a proportion relative to the diffuseness of the injury. In fact the difficult cases of persistent headache, giddiness, and lack of concentration may, and often do, follow on relatively mild forms of injury. Unpleasant sequelæ, therefore, cannot be prophesied as arising from some particular type of lesion, though it may safely be said that a greater percentage of permanent disability results from the more gross forms of damage.

One of the most feared risks of head injury is the likelihood of "traumatic epilepsy." When epileptiform convulsions occur they most frequently adopt a generalized character, the focal epilepsies of Jacksonian type presenting in only a minor percentage of cases. This sequel may develop early or late in the course of recovery, with a latent interval of up to two years or more. The epileptic attacks which develop early are more likely to respond to treatment, and the delayed cases are apt to be protracted or permanent. Epileptic manifestations follow cortical injury, and the delayed type is associated with progressive scarring or cyst formation. Convulsions occurring during a concussive stage do not indicate a delayed liability to fits.

Patients exhibiting prolonged stupor are more liable to produce sequelæ, though many recover without the slightest discomfort. The presence of a fracture has been considered to bear, to some extent, an immunity from disabling after-effects: the proportion of head injuries without fracture giving rise to troublesome complaints is much greater than that when associated fracture occurs. The prognosis as regards ability to return to full work does not depend on relative damage in respect to duration of unconsciousness, but the most seriously damaged patients present a greater proportion of permanent disablement.

TREATMENT

Intracranial injuries and their complications are difficult enough to assess by careful and prolonged observation that all means at one's disposal should be employed, therefore radiographic examination should be made at the earliest opportunity. The patient's state, both mental and physical, should be registered at repeated short intervals throughout the first twenty-four hours; pulse rate and volume, blood pressure, and respiratory rate and rhythm being particularly noted. Furthermore careful attention should be paid to the limbs and eyes, and the degree of consciousness. By these means alone can any fair conclusion be drawn and due *treatment applied.*

How often is surgical intervention required? A small proportion of cases only necessitate surgical measures, excluding excision and exploration of scalp wounds with subsequent suture. The general indications for operation are: compound fractures, certain non-compound depressed fractures and intracranial hæmorrhage.

The above indications are referable to the cranium and its cavity and consideration must now be given to the question of cerebral damage proper. Few patients exhibiting evidence of cerebral injury require surgery in the absence of hæmorrhage, and it is in these cases in which increasing intracranial tension is associated with progressive extension of focal signs that cautious discrimination must be exercised in the differentiation of hæmorrhage from œdema.

All subjects of head injury must develop œdema in minor or major intensities, and methods have been designed to avoid or alleviate excessive degrees of effusion. In a large proportion of patients a dose of calomel by mouth as soon as the person is co-operative enough to swallow, followed later by saline purgatives, will deal adequately with the condition. Patients may continue, however, in a drowsy or comatose state, and then some more active procedure will prove necessary. A few years ago there was a tendency to subject such cases to operative measures, in the form of bitemporal decompression, but there is nowadays a disinclination to operate on these patients, with a consequent lowered mortality. The introduction of dehydration methods has replaced operation, and this may be effected by various means, such as oral administration of saline purgatives, enemas of hypertonic solutions of magnesium sulphate, or intravenous injections of hypertonic solutions of sodium chloride or sugars. Some observers prefer to induce relief in a more direct fashion by repeated lumbar puncture. Each method has adherents who advocate its particular application to the exclusion of others, but in practice all these methods bear some material use.

Lumbar puncture, while advocated by some surgeons, is condemned by others. Care must be exercised whichever method is applied and with lumbar puncture manometric control should be employed. Patients with increasing pressure and signs of medullary disturbance are not advisedly subjected to lumbar puncture as a fatal termination may result. Other contra-indications occur in compound fractures, when increased risk of infection is entailed; and localized, or gross, cerebral lacerations, on account of the added risk of hæmorrhage. In all other cases when signs or symptoms continue after twenty-four hours more is likely to be gained than lost by its use. Manometric estimations of cerebrospinal fluid pressure make it possible to visualize the intracranial state, and define a standard on which to base subsequent findings. The cerebrospinal fluid gives further help by its colour and cell content, a yellow discoloration indicating the presence of disintegrating blood, while the presence of red blood corpuscles points to recent bleeding, and a red cell count may indicate, to some extent, the amount of blood effused.

It is apparent therefore that persisting intracranial hypertension demands treatment designed to cause diminution of œdema. This is effected first of all by limiting the intake of fluids, and secondly by encouraging the absorption of fluid through the use of one or other means of dehydration. Milder symptoms will respond to oral administration of saline purgatives, more defined cases necessitate the employment of enemas of magnesium sulphate in 50 per cent. solution, six ounces being instilled slowly to be retained twenty to thirty minutes. Intravenous therapy should be reserved for active and urgent use as in the differentiation of œdema from hæmorrhage or when sudden changes for the worse demand immediate action. The disadvantage of intravenous injection lies in the liability to secondary elevations in pressure, though these may be lessened by administering glucose or sucrose in preference to salt. Sucrose solutions are said not to cause secondary elevations of pressure, and seem preferable to glucose. Both are employed in 50 per cent. solution, 50 to 100 c.cm. being injected at a time. Sodium chloride is best in 30 per cent. solution.

Restlessness must be controlled by keeping the patient as free as possible from stimulation of all kinds, administering general sedatives, and employing dehydration or lumbar puncture when necessary. The choice of sedative rests with bromide, chloral, medinal, paraldehyde, luminal and similar preparations. Very restless patients necessitate the use of more potent drugs; under these conditions it may be imperative to fall back on morphine or heroin, but great caution must then be exercised lest respiratory depression or masking of signs result.

Persistent headache should be investigated by lumbar puncture and appropriate treatment carried out according to pressure findings. High pressures should be met by elevation of the head of the bed, regular lumbar puncture or dehydration according to preference, and employment of suitable sedatives. Minor degrees of headache will respond to simple drugs such as aspirin or phenacetin. Continued local headache may arise from local contusion, or be associated with localized collections of fluid. Unrelieved headache of this latter type may even need exploration at the site of the pain, but a proportion will respond to intrathecal injections of air.

Giddiness, another troublesome sequel to these injuries, depends for its causation on more than one factor: no doubt partly vestibular, it also is associated with vasomotor disturbance, and has a psychogenic element. Improvement in the general condition will do much towards vasomotor control, and temporary alleviation may be sought in regular small doses of luminal.

Traumatic epilepsy is a distressing condition and effort should be made to avoid its occurrence. Depressed fractures in the region of the motor areas must be subjected to operation, and other fractures in these regions should be carefully X-rayed to ensure that no spicules of bone have penetrated the cerebral tissues. In any case in which the possibility of supervening epilepsy is suspected it is well to advise regular dosage with bromide or luminal for many months as a prophylactic measure. Delayed focal epilepsies are consequent on scarring or cyst formation and should be explored.

General nursing and quietude naturally form a very important part of treatment. During the shocked stage the patient must be kept flat. The bed should be in a quiet and darkened room, whenever possible. It is well to remember that if a patient remains unconscious for any prolonged period attention will have to be devoted to the condition of the bladder, and any likelihood of prolonged retention of urine avoided. Darkening of the room is one means of reducing the "irritation" but it acts partly by reducing ocular stimuli ; this is of particular importance in certain cases as photophobia may be marked. It is essential to enforce rest until all symptoms abate; the simpler forms of injury, however, need a matter of only seven to ten days. Reaction to change of posture will serve as a convenient indication of progress. The question of visitors is largely dependant on the type of visitor, for while some may be of a quieting disposition others can be most disturbing. Anything which demands the patient's persistent attention is inadvisable.

The resumption of regular duties must be slow, depending on the extent of the injury and the nature of the person's occupation. Both mental stress and physical strain must be avoided, hence intellectual activities and labouring both demand prolonged abstention from duties. Apart from the very mild cases already mentioned, it is always wise to allow one month's rest before resuming duties in all straightforward concussions, provided that the case remains symptomless. The extensive injuries necessitate six to twelve months' controlled existence. Each case constitutes an individual problem gauged only by contact and experience.

INFLUENCE OF ALTITUDE ON ASTHMA

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THE following clinical observations are based upon many years of experience, at Davos Platz. For a long time, about eighty years, the climate of the high alps of Switzerland has been famous the world over for the treatment of certain morbid conditions, the principal ones being tuberculous affections of all parts of the body, e.g. lungs, bones, joints, and serous membranes. There is, however, another disorder in which, almost invariably, great relief and amelioration and often even a permanent cure are obtained by a sojourn of sufficient duration, in the alpine climate, preferably at an altitude of about 5,000 ft. The condition is bronchial asthma, and it is principally this subject which will be dealt with in this article.

BENEFICIAL EFFECTS

The beneficial effects of the alpine climate may be summarized as follows :—

(1) Owing to the altitude the air is rarefied and the barometric pressure lower than at sea level, therefore the partial pressure of oxygen is correspondingly diminished. The physiological effect of this is that breathing must necessarily be deeper in order to allow the tissues to receive their proper oxygenation. For the same reason the blood changes its character, the red corpuscles and hæmoglobin both showing an increase. This is not a relative increase due to diminution of the plasma, but is a real augmentation. The total amount of blood is also actually increased.

(2) There is much less moisture in the air of mountains than at lower levels, and this dry air has a stimulating effect upon the respiratory membranes. There is also a remarkable absence of wind and dust, especially is this so during the winter months when the snow is on the ground. A fine winter day is quite windless, and is absolutely free from dust. The air therefore is purer and the heating and lighting powers of the sun greater at the higher altitudes.

Acclimatization to altitude consists in the adaptation of the organism to these changed meteorological conditions. The increased pulmonary ventilation, the enrichment of the blood, the response of the skin, alimentary tract, and kidneys to the altered conditions establish the vital mechanism at a new level. It usually takes a week to ten days to complete this acclimatization, and during this period there may be slight inconvenience, such as some headache, sleeplessness, fatigue, and breathlessness.

EFFECTS IN ASTHMA

From the above considerations it is evident that there is in the alpine climate a therapeutic agent of considerable activity and value, especially as regards morbid conditions of the respiratory organs. An affection which reacts in a most remarkable manner to this climate is bronchial asthma. The results are often very striking, and sometimes almost immediate. This is not merely a temporary affair during the patient's stay in the mountains. If the period of sojourn is long enough, the beneficial results are often permanent. In any case even a stay of short duration is frequently of great benefit. The value, both physical and mental, of freedom from suffering for weeks or months must be obvious to any thinking person. The most striking and immediate results are obtained in children. This may be readily understood, because secondary changes, such as emphysema, bronchitis, thoracic lesions, and cardiac strain, have not yet had time to develop. But even in older and more advanced cases, when these secondary changes have already occurred, a marked improvement is frequently observed in the course of a few weeks, and such patients are often from the beginning free from acute and violent asthmatic attacks. The general health recovers, the cardiac functions improve, chronic dyspnœa abates, the secondary bronchitis diminishes, and the capacity for exercise, effort and work is markedly increased.

It is most interesting not only to medical men but also to lay people, to see asthmatics who have been subject for weeks to almost daily attacks with dyspnœa and all its attendant suffering and misery start out for the mountains. Many of them already feel much more comfortable at an altitude of

3,000 to 4,000 ft. and breathe more easily, and at from 5,000 to 6,000 ft. the asthmatic breathing and wheezing often completely disappear. They are astonished and can hardly believe that they are able to pass comfortable days without the aid of the hypodermic syringe. With the disappearance of the attacks and the relief and rest thus obtained, the dyspnœa decreases, cyanosis subsides, and the associated bronchitis improves. The quantity of sputum frequently decreases in a very marked way in a few days. As the asthmatic conditions improve the mental state of the patient also becomes much better, his outlook on life is changed, and he feels cheerful, rested and hopeful.

CHANGES IN RESPIRATORY MECHANISM

The alterations in the mechanism of the respiration as altitude increases, and therefore as the oxygen pressure decreases, are very much more complicated than is generally supposed. Even in healthy people there are great changes, and the behaviour of a person with pathological respiratory functions differs very much from that of a healthy person. There is, at first at a high altitude a definite decrease in the vital capacity, but this in healthy people disappears in a few days. The greater need for oxygen is compensated by deeper and increased frequency of the respirations. In addition to this the actual volume of the lungs becomes increased at high altitudes. There is therefore produced by this increase an actual enlargement of the ventilating surface of the lung leading to an improvement in the gas exchange. In high altitude climates asthma is of extremely rare occurrence among the inhabitants. There is not an absolute immunity but the condition is seldom met with. One of the principal factors which influence asthma in the alpine climate is the purity of the air. The high mountain air is pure, and contains a very small content of bacteria and dust.The dust which hangs as a thick veil over large cities cuts off and filters the sunlight therefore weakening considerably the biological strength of its rays and thus diminishing their bacteria killing capacity. In addition the purity and dryness of the mountain air exert a favourable influence by ameliorating those catarrhal conditions which are so frequently met with in association with asthma. Another factor of great importance is the almost complete absence of wind. As a result the patient is protected from too rapid cooling and can therefore enjoy the open air at all times of the year, a matter of great importance to the asthmatic who should take exercise in the open air as much as possible.

PSYCHOLOGICAL EFFECTS

Of considerable importance in the alleviation and cure of asthma is the psychological effect of the light and warmth of the alpine sun combined with the beauty of the surrounding scenery. This psychological influence is very important because the longer asthma and its depressing effects last, the more does it tend to promote hypochondriasis and to break down the patient's mental resistance. Breathing exercises are valuable as a means of loosening cramped muscles, and are also of considerable psychological value.

SUMMARY

(1) For cases of bronchial asthma, the alpine climate is strongly indicated. It usually has a rapid and beneficial effect on the patient, both as regards the local disease and the general health. The attacks tend to become less frequent and less severe, and not infrequently disappear altogether. The characteristics of the climate undoubtedly play a large part in the amelioration of symptoms. The dry pure air, the absence of dust and microbes, freedom from fog and damp, and the high degree of insolation all play their part.

(2) To get the best results asthmatic patients should be sent to the alps in the early stages before secondary changes have occurred. For this reason children respond more quickly than adults. The changes in the breathing mechanism which occur at high altitudes have a very favourable effect.

(3) In addition to the actual physical improvements the psychological change in the patient is of great value. The improvement of the general health, the freedom or comparative freedom from attacks, the ability to get about and take exercise and lead a more or less normal life, all help to encourage the patient and give him renewed hope, a very important point in the treatment of asthma.

GENERAL PRACTICE

VIII—THE FINANCIAL SIDE OF PRACTICE

By AN EX-INSPECTOR OF TAXES.

COMMON sense dictates that the medical practitioner should be as well aware of his real financial position as any other professional or business man and should be competent to handle the business problems that are a necessary part of his life. He may get along for a while with an occasional glance at his bank balance, but a time will come when something more accurate in the way of a financial statement will be urgently necessary.

It is common knowledge that a practice has a saleable value and that the price depends largely upon the income which it yields. Suppose that for some reason a practice is put up for sale how will the present holder approach the prospective purchaser? Can he tell him exactly what it is now bringing in or can he show that it is growing yearly in value and not decreasing? If it is wished to take a partner can he be shown exactly what he stands to gain and what lump sum the share offered him is worth? The answers will depend upon how the money side of the vendor's affairs has been recorded. Practitioners are scrupulously careful in their records of patients' medical history, but how many fail in the simple duty they owe themselves to keep their own affairs straight. But even apart from all these possibilities, which may appear remote to many, there is the all-important and yearly task of filling up the income-tax form and ensuring that no more than the tax really due is paid. To the average layman the mention of account keeping is anathema. He thinks immediately of the formidable books and ledgers which the merchant keeps and the numerous clerks on office stools and wonders if his own leisure is going to be an echo of that. The purpose of this article is to show that account keeping can be a simple matter for a professional man and can be thoroughly carried out in a few minutes daily.

RECEIPTS

It is proposed to deal first with the recording of receipts. Now it is clear that accuracy is the first essential and that *all* fees must be entered. A small fee may seem a trivial thing to worry about compared with a year's income, but if inaccuracy be allowed to creep into detail how quick is the suspicion of its presence among the larger items too. The first suggestion, then, is to keep a special fee-book which should be written up daily, entering all items, however trivial some of them may be. The practitioner will then be in a position to say, without qualification, that it contains his total receipts. The value of that position is obvious; if he has omitted to enter everything and is forced to admit that his record is incomplete the other person is left guessing about the extent of the omissions and it is little better than if no records at all had been kept. Suppose the practitioner is dealing with the Inspector of Taxes and has to confess to him that some of the fees have been omitted he will certainly make an addition—the amount of which may be much in excess of the doctor's own estimate.

It is unwise to use the case book to record fees. I have sometimes found doctors to do this to their own great inconvenience later. It is most likely that the record of fees will have to be produced to the Inspector; how can this be done if it is at the same time a record of patients' medical history and therefore strictly confidential? It would be a poor reward for a year's accounting if it was found that the standards of the profession made it a closed book to outsiders.

The record of fees on cards is also unsatisfactory, as this entails going through the whole index at the end of the year and listing the various receipts. Should the inspector or any other person wish to check the figures, the contents of the card cabinet would have to be given to him, with the result that the practitioner is put to the inconvenience of being temporarily without his cards and the inspector has to cover the same ground all over again.

By far the simplest method is to keep a separate fee-book which will contain merely the date, patient's name and amount of the receipt. This should be written up regularly, daily or weekly, according to convenience, so that at the end of the year no elaborate preparations are necessary in order to see the exact position.

EXPENSES

In addition to the fee book an expense book is needed. This will have to be more elaborate as it will be necessary to show the nature of the expenses. There is a wide choice of books and it is possible to obtain many varieties especially designed for the medical profession but, if it is wished to reduce book-keeping to the minimum, I would recommend a book ruled with about twelve vertical columns, giving a page to each month and with horizontal rulings for each day. Each column should be headed with one of the normal classes of expenditure, such as:

(1) Rent, rates and repairs.
(2) Salaries and wages.
(3) Motor expenses.
(4) Medical supplies.
(5) Telephone, postage and stationery.
(6) Light and heat.
(7) Laundry.
(8) Waiting-room.
(9) Reference books and periodicals.
(10) Consultation and anæsthetists' fees.
(11) Insurance.
(12) Sundries.

This list will not be exhaustive for every doctor, but it covers all the usual recurring items, and practitioners who wish to delete from or add to it can make such alterations as suit their circumstances while using the general framework as a basis. With the rulings I have suggested the actual recording becomes a matter of only a few minutes daily. On payment of any sum all that is required is to make the entry on the line corresponding to the day of the month and in the appropriate column. At the end of each month the columns should be totted so that all will be in readiness for the final statement.

It may happen that the busy doctor will find it hard to keep a note of small cash payments such as petrol bought en route, house-cleaning materials, tips and so on, and in this case estimates may be substituted for actual records provided they do not amount in the aggregate to any substantial sum. It should be remembered, however, that the more accurate the books the stronger the position and that, especially in dealings with the Inspector of Taxes, estimates are likely to increase rather than diminish the tax.

The advantage of knowing exactly what is spent is so obvious that none will deny it although many neglect the means towards this desirable end. Some traders are dishonest and many are careless, and a permanent record of payments enables the detection of fluctuations which can be investigated if the explanation be not apparent. Again, many would like to practise economy but do not know where to begin or what to cut down, for the simple reason that they have but a hazy notion of what they spend. With monthly and yearly totals it is possible to see at a glance how much each class of expenditure is costing, and the practitioner will then be in a position to decide on reductions, if necessary.

Before leaving the question of records, I must point out that the bank account should be used as an auxiliary to its fullest extent. Without suspecting an attempt at misrepresentation prudence demands that the Inspector of Taxes or other person to whom books are tendered as evidence should satisfy himself that the facts are as stated. To do this he may ask for the bank pass-book as verification. A doctor with substantial private means or other source of income would do well to keep a separate bank account for his professional affairs, but this is unnecessary in ordinary cases. It is, however, most desirable that all fees should be lodged and as many bills as possible paid by cheque. There is then a ready means of confirming the total of the fee book and, if receipts get lost, the paid cheques will act as substitutes.

When the books are totalled for a twelve-month period the practitioner is in a position to ascertain his profit and complete his return of income. The inspector would not accept a bald statement of expenses without making some inquiries about their nature and bearing on the profession, and it is therefore proposed to go through the twelve headings enumerated above and show what adjustments he is likely to suggest and how far his proposals may be safely agreed to. The profit arrived at after making these various adjustments will be the total net profit and this figure will be the basis not only of the income-tax assessment but also of any valuation required for the purpose of a sale, partnership, or estate duty.

(1) *Rent, rates, and repairs.*—If the practitioner occupies a surgery apart from his private house he will be entitled to charge the full cost, but if not, he may deduct only the proportion which covers his professional rooms. In estimating this proportion he should take into account not only the number of rooms but also the fact that the surgery and waiting-room are among the best in the house and have the highest letting value. Nor should he overlook a proportion of the servants' rooms since some of the servants will be engaged largely in duties connected with the practice—answering the door and cleaning surgery. If he keeps a secretary her office and other rooms, if any, will be included. It is well to claim two-thirds of rent and rates, which is the maximum allowed. If the inspector attempts to reduce this proportion the matter can be discussed on the lines indicated above. Two-thirds is, however, generally allowed. When a doctor owns his house the Schedule A assessment (property tax), or the appropriate fraction of it, may be deducted instead of rent.

Repairs is a bone of contention in nearly all accounts. The amount which may be charged depends entirely on the particular circumstances of each case and it would be quite impossible to lay down hard and fast rules, but two restrictions must be applied. First, the charge in the accounts must be directly referable to the use of the house for professional purposes; the cost of re-decorating the professional rooms could be charged in full but only a proportion of, say, roof repairs and exterior painting could be claimed. The other restriction is that any sum included for additions or structural alterations must be completely eliminated. For example, the cost of installation of central heating would not be allowed, but if such a system were already in use the renewal of pipes in metal of the same quality could be charged.

This heading should also include the cost of repairs and renewals of furniture and fittings in the professional rooms.

(2) *Salaries and wages.*—This will include the salary of secretary and nurse and wages of the chauffeur and of servants

engaged in duties attendant on the practice. Some adjustment, may, however, be necessary. For example, the last-named will normally perform some purely household duties as well and a proportion will have to be deducted to cover these. On the other hand, there may be wages to a charwoman which, being mainly for the household, will not appear in the expense book, but some proportion might be claimed for extra cleaning of surgery. It may also be necessary to restrict the chauffeur's wages, but this point will be dealt with in the next section.

There is a simple way, not generally known, by which a married man can save tax on £56, which at the Standard Rate of 4*s*. 9*d*., amounts to £13. 6*s*. All he need do is to arrange with his wife that she will look after his accounts or perform some other service connected with his practice. In return he should pay her a salary of £56 per year, which he may include in his total of salaries. He will be assessed separately on this income of his wife's, but against the assessment he will be granted an allowance of £11, being the usual one-fifth for earned income, and an additional allowance of £45, making a total of £56, so that the assessment will carry no duty. When filling up his return form he should enter this £56, in the section entitled " wife's income," describing it as " Salary received from me for secretarial services," (or whatever services are given), and when he gets his notice of assessment he should make sure that the inspector has not omitted to include the £45, with the usual family reliefs. Of course, this whole transaction must be a perfectly genuine one, that is to say, some reasonable service must be actually performed and the salary actually paid.

(3) *Motor expenses.*—This is always a heavy item, and it is desirable that exact records should be kept as odd sums may mount up to quite a large figure. It will be found that the inspector will not allow the full charge as the car will, of course, be used to some extent for private purposes. The amount of the restriction will naturally vary according to circumstances. The ideal way to meet the case is to keep a note of the mileage of private journeys, but this is a counsel of perfection which few will follow, and most doctors will be satisfied to agree to a deduction of some reasonable fraction to

cover week-end and evening use.

(4) *Medical supplies* will include all such requisites as chemicals, drugs and dressings, renewal of medical linen, renewal of instruments and upkeep of apparatus and will usually be deductible in full. It should, however, be noted that in connection with instruments only the cost of renewal may be charged. The initial cost of new types of instruments (or a new apparatus) which do not form part of the existing equipment must be excluded.

(5) *Telephone, postage and stationery.*—The Inspector may cut down the telephone charge by some fraction to represent private use and the matter is one for compromise, but postage and stationery will be allowable in full as the disallowable fraction is negligible.

(6) *Light and heat.*—If the surgery is in the doctor's residence the simplest way to deal with this item is to enter the full cost of light and coal in the expense book and, in preparing the account, deduct only such a fraction as will cover professional use. This will be based on the number of rooms occupied professionally plus some addition for hot-water supply and lighting and heating of servants' quarters.

(7) *Laundry.*—In addition to the doctor's own linen such as white coats and towels, he should include similar linen for the secretary or nurse and the laundry of servants mainly employed in duties necessitated by his practice.

(8) *Waiting-room.*—Here enter such items as periodicals, flowers and similar amenities supplied for patients' use. The charge should be admitted in full and attempts by the Inspector to reduce it on the ground that the family reads the periodicals should be resisted.

(9) *Reference books and periodicals.*—Subscriptions to medical journals and renewal of reference books are allowable, but new books which form a permanent addition to the library may not be charged.

(10) *Consultation fees.*—The Inspector may ask for the names and addresses of recipients with a view to checking their income tax returns. The practitioner is under no legal obligation to supply this information and he may be guided by his own wishes in the matter.

(11) *Insurance.*—These payments will fall under a number of policies. Fire and burglary insurance will be allowable only in part where the doctor resides on the premises. Employers' liability, National Health and Unemployment should be claimed for servants employed in connection with the profession. Premiums on the usual doctors' indemnity policies may be deducted but not premiums to cover loss of income in case of sickness. Life insurance premiums should not be entered here as they are shown separately at the end of the return form. Motor insurance is more conveniently included with general motor expenses.

(12) *Sundries* will, of course, include a number of small items such as tips and cleaning materials and, being small, will usually be allowed without question.

In addition to the above there is a further item which cannot conveniently be entered in the expense book, but which must not be forgotten. This is the cost of maintenance of servants. There is no fixed allowance but £50 each is considered a reasonable figure in the usual household.

The deterioration of motors and plant such as X-ray apparatus may be dealt with in either of two ways. The cost of replacement may be deducted in the year in which it occurs or, alternatively, a yearly allowance called "wear and tear" may be claimed. This takes the form of a percentage of the cost of the machine; 15 per cent. to 20 per cent. is normally allowed on motors and 7½ per cent. to 10 per cent. on electrical plant.

An account presented on the above lines will usually satisfy the Inspector. Should he want further information on debatable points the doctor's best plan is to call on him and talk the matter over and he will find most Inspectors quite reasonable. If, however, agreement be not reached his proper course is to wait until he receives his notice of assessment; he should then immediately write to the Inspector stating that he wishes to appeal on the grounds that the figure is excessive. He will, in due course, be given an opportunity of appearing before the Income Tax Commissioners who, after giving full consideration to his arguments, will fix the assessment at a figure which they consider just.

PRACTICAL NOTES

THE CHOICE OF HYPNOTICS

As recently as 1930 experimental work showed that chloral still stood at the head of the list of efficient hypnotics despite the enormous activity of modern chemical investigators. According to G. P. Grabfield (*Journal of the American Medical Association*, October 24, 1936, cvii, 1381) this drug is undoubtedly the most useful of the hypnotics and the cheapest. Given well diluted in water it produces sleep within an hour and in the usual dose of 5 to 10 grains it is entirely harmless, even in heart disease. For quick action of short duration it is suggested that two of the barbiturate series are particularly indicated : phenobarbital, 1 to 2 grains has proved very useful, and barbital itself for slightly more prolonged and less prompt action. When some action on the motor side of the nervous system is required, on those occasions when sleep is disturbed by restlessness, phenobarbital and the bromides are most useful, but it is pointed out that the strictly hypnotic action of these drugs is relatively small. The opium group should not be used for sleep-producing results when pain is not a factor, and it is suggested that one of the analgesic drugs, such as acetylsalicylic acid, used either alone or in combination with chloral or a barbiturate, will produce surprisingly efficient results without the obvious dangers which morphine itself possesses.

THE TREATMENT OF ANGINA

Reviewing various measures of treatment available for angina pectoris, Leins-Forrer (*Schweizerische medizinische Wochenschrift*, October, 1936, lxvi, 1059) lays particular stress upon the use of tissue extracts which dilate the coronary arteries. For this purpose he has found special value in the use of a preparation of liver extract, 1 c.cm. of which contains 1 mgm. of a capillary-dilating substance. This can be given intravenously and has not the disadvantage of causing circulatory collapse as the result of dilating the whole capillary system of the body. As other measures, this author strongly recommends the use of intravenous glucose solutions limited to a maximum of 20 c.cm. of a strength not exceeding 20 per cent. He has also found that small doses of strophanthin are of value. Other indications for the liver extract, which is known as "reflaxan," include arteriosclerosis and endarteritis when these appear to have affected the circulatory system of the heart.

HEAT TREATMENT OF OZÆNA

Following upon a report from France, in which acetylcholine was recommended for the treatment of chronic atrophic rhinitis, comes a suggestion from C. K. Gale of New York (*Archives of Physical Therapy*, October, 1936, xvii, 646) that the direct application of heat to a large surface of the nasal mucous membrane for prolonged periods of time, offers a most effective method of treating ozæna. Two types of rubber applicators have been used, one is of special design and shape, and when inserted into the nose and filled with a heated solution from an Elliott apparatus, it establishes contact with both medial and lateral walls of the nose during the whole extent of the inferior meatus. The second type of applicator is made of very thin, but strong, rubber, and has no shape so that it conforms by its ballooning action to the space in which it is confined. In this way contact is established in areas of the Eustachian tube, the sphenoidal sinus and the posterior ethmoidal cells. It is claimed that with a circulating solution through these applicators of 125° F. a much higher local temperature can be obtained than with short wave radiation, and the clinical results in a small series of cases have been very encouraging.

ENDOCRINE TREATMENT OF PROSTATIC HYPERTROPHY

B. Cunéo (*Bulletin de l'Académie de médecine*, Paris, 1936, cxvi, 434) brings forward arguments that hypertrophy of the prostate arises not in the prostate proper but from the prostatic utricle which is derived from Müller's ducts, and supports the view that adenoma of the prostate is due to diminution of the male hormones. As there is some uncertainty about the number of hormones formed by the constituent cells of the testis—the spermatogenic, the interstital and those of Sertoli—he has used a preparation containing a glycerin extract of the whole testis of bulls, and obtained encouraging results from the oral administration, though the hypodermic use of ampoules made by the firm of Dausse can be employed. Twenty-three patients with definite prostatic hypertrophy have been thus treated and the results which were not universally remarkable are conscientiously analyzed. This form of treatment is regarded as essentially preventive, and it is pointed out that it would be a mistake to advise against prostatectomy in advanced cases.

THE TREATMENT OF BIRTH MARKS

Modern methods of treating nævi afford much better results than in the pre-radiation days. E. C. Fox (*Urologic and Cutaneous Review*, November, 1936, xl, 820) in a helpful review states that angiomas should be treated as soon as possible after their appearance. The stellary form (a small telangiectasis) is best removed by electrolysis. The port-wine mark, which responds less satisfactorily to any treatment than other vascular nævi, is probably best attacked by carbon dioxide snow at intervals until the desired bleaching is obtained. For strawberry marks, radium is the treatment of choice. Suberythema doses at four to six weekly intervals filtered to remove only the soft beta rays, give the best results. Carbon dioxide snow may, at times, be used with efficient results and may be combined with radium therapy. Cavernous angioma may be treated if superficial in the same way as the strawberry marks, but when deep vessels are involved, greater filtration is necessary in order to obtain gamma radiation to reach the deeper areas. In recent years, sclerosing solutions, such as sodium morrhuate, have been used with good results for this type of nævus, and extensive deep lesions may require interstitial implantation of radium needles.

A NEW DRUG FOR CHRONIC ARTHRITIS

Claimed to have none of the objectionable features of salicylates and yet to resemble them in therapeutic action, bromsalizol is described by D. I. Macht and R. W. B. Mayo (*Surgery, Gynecology and Obstetrics*, November, 1936, xliii, 603) as of value in chronic arthritis. Chemically the drug is closely allied to salicylic acid and is a derivative of saligenin which is found in nature in the glucoside known as salicin. Doses of from 5 to 10 grains of bromsalizol were administered three times a day to one hundred ambulant patients with chronic arthritis and 75 per cent. were definitely relieved of pain. Secondly, a group of twenty-four female patients confined to bed with inveterate arthritic manifestations were given bromsalizol in tablet form in the dosage of 10 grains, three times a day. A definite beneficial effect as regards pain and comfort was obtained in sixteen of the patients. In none of the patients treated was there any irritation of the stomach and no objectionable by-effect was noted. Compared with the effects of other antipyretics, the relief experienced was certainly equal to that obtained with other medicaments used.

TRICHLORETHYLENE AS A SKIN CLEANSER

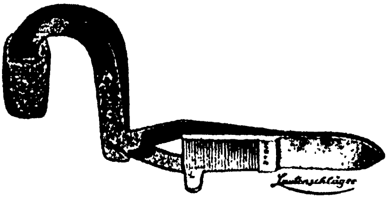
Very similar in its properties to chloroform, but without the same toxic effects, trichlorethylene is recommended by H. B. Trumper, A. Thelwall Jones, and H. Taylor (*Lancet*, December 12, 1936, ii, 1390) as a safe and efficient cleanser for skin and wounds. It has now been in use in twelve factories of the I.C.I. (Metals) Group for some time and the majority of wounds treated have been cuts of the fingers. It is applied with an Enot spray which is held at a distance of half to two inches from the wound. The amount used varies with the size of the wound and the amount of grease present. The trichlorethylene dissolves the oil and grease and flows away like a dirty liquid after which the wound presents a moderately clean appearance. An antiseptic such as flavine is then applied and the wound is dressed in a normal manner. Trichlorethylene has also been found useful in the treatment of tar burns and for cleansing the skin of workers using tar and applied products.

THE TREATMENT OF SPLENOMEGALY IN MALARIA

M. Ascoli (*Il Policlinico* (Practical Section), November 9, 1936, 2006) contributes a further note on his method of treating the splenomegaly of malaria by means of injections of suprarenal extract. He begins by giving daily intravenous injections of 1/100 mgm. of surrenase (Serono), increasing up to 1/10 mgm. given for twenty times. Such injections were free from any intolerance but intracutaneous injections were not so tolerated. Apart from refractory cases or in those when the spleen reached more than four fingers breadth beyond the costal margin he obtained satisfactory results in causing diminution of its volume. As regards the practical results the patients were restored to health long before the spleen had returned to its normal size nor were there any cases of relapse. The field of election for the new treatment may furthermore be extended to the hæmorrhage diathesis and to hæmolytic splenomegaly, and Timpano has proved its value as an adjuvant to tartate of antimony in infantile kala-azar, in which also he has been able to reduce the dosage of the antimony during the treatment.

A HOLDER FOR STERILE STOPPERS

When medical practitioners are using saline or other solutions from sterile flasks the problem of what to do with the sterile plug of cotton-wool often becomes acute when there are but few assistants. K. Kisskalt (*Münchener medizinische Wochenschrift*, November 20, 1936, lxxxiii, 1933) has therefore devised what he terms swan-necked forceps. The illustration indicates exactly their shape and they are made so that pressure on the handles is necessary in order to release anything held between the prongs. Such forceps might also have a value in bacteriological laboratories.



AN EYE SHIELD FOR INDUSTRY

The protection of the eyes of a worker from flying pieces of coal, stone or metal, is obviously a matter of great importance, and C. G. Kay Sharp (*British Journal of Ophthalmology*, December, 1936, xx, 683) has accordingly devised a new eye shield particularly for use by miners. It consists of a flexible-fibre head band easily adjustable to any shape of head. On the front of the head band is a metal attachment with double ball-and-socket joint which supports the metal frame containing the protective material. This is laminated glass for miners and mica or gauze for other trades. The protector can be placed in any required position, is easy to apply, and when not in use can be carried in the pocket.

UNRESTRICTED DIET IN GASTRIC HÆMORRHAGE

It is claimed by E. Meulengracht (*Wiener klinische Wochenschrift*, December 4, 1936, xlix, 1481) that a considerable reduction in the mortality from hæmatemesis and melæna from gastric ulcer can be obtained by the unorthodox method of giving a very generous diet from the onset. From the first day of admission into hospital the patient receives a diet containing bread and butter, tea, porridge, cocoa and a mid-day meal containing a choice from various soups, omelette, fish, vegetable puddings, mashed potatoes and vegetable purées. Between the meals the patient is given milk and the actual quantities of the food are left entirely to the patient's wishes. The calorie value of the diet is on the average 2,300. The patients are kept in bed for two to three weeks and they receive an alkaline powder three times a day and also some iron preparation. In a few cases one or more blood transfusions were given shortly after admission, but for the most part no other treatment was necessary. The "soft" diet was continued for some months after discharge from hospital. It is claimed that there have only been three deaths in a total of 273 cases, and one of these was from a perforation followed by peritonitis. It is claimed that more rest is secured for the stomach than if it is allowed to undergo hunger contractions on a restricted diet, and complete rest is better obtained on the programme here summarized.

URTICARIA AND APPENDICITIS

The fact that urticaria, acute or chronic, may be associated with a septic focus, the removal of which leads to a cure of the condition is emphasized by a small series of cases reported by P. Chevallier and M. Colin (*La Presse médicale*, December 28, 1936, xliv, 1942), in which removal of the appendix was successful in alleviating the dermatological condition. In three cases the urticaria was definitely associated with ingestion of some article of diet, and in two it was found rather by chance that the removal of the appendix in an acute inflammatory condition caused disappearance of the urticaria. In one other instance in which certain food substances, and in particular, fish and eggs, provoked a urticarial attack, some tenderness over McBurney's point led to removal of the appendix and cure of the urticaria. In another patient urticaria appeared to be associated with exposure to heat and no connection with food could be ascertained. Here again slight tenderness at McBurney's point led to the removal of an appendix which did not appear to be pathological. Nevertheless, following operation there was a slight diminution in the severity of the urticarial attacks and after three months they disappeared altogether. No explanation is offered for these results, but the suggestion is put forward that appendicectomy should be considered in resistant cases of this troublesome complaint.

REVIEWS OF BOOKS

An Introduction to General Practice. By E. KAYE LE FLEMING, M.A., M.D. London: Edward Arnold & Co., 1936. Pp. viii and 150. Price 5*s.*

THIS is a thoroughly practical guide to those on the threshold of general practice, and is clearly written by one who has a record of work in a country district early in the century, before the National Insurance Act (1911), and has behind him the full confidence of his colleagues, as is abundantly shown by his position as their Direct Representative on the General Medical Council for nearly a decade, and by high office in the British Medical Association. As a practitioner before the advent of the Panel he has watched with generous approval the increasing activity of the State in the promotion of the common health, and remarks that those who complain of the encroachments on their practice have only themselves to blame for failing to anticipate the State in supplying a general want, for example, ante-natal clinics. In looking back Dr. Le Fleming pays a tribute to the fine type of practitioner of the last century who, isolated in remote parts of the country, dealt single-handed, skilfully, and devotedly with every situation. On the question of the future of midwifery, it is pointed out that to deprive the practitioner of his proper place in this branch would be an encroachment on his province, and would cut him off from the most important medical event in the life of many women. The whole subject is so concisely and wisely reviewed and the directions are so sound that every newly-qualified practitioner should make this book his Bradshaw for a successful and happy medical journey through life.

Kidney Pain: its Causation and Treatment. By J. LEON JONA, D.SC., M.D., M.S. London: J. and A. Churchill, Ltd., 1937. Pp. vii and 94. Illustrations 61. Price 7*s.* 6*d.*

THIS well-illustrated book is the outcome of ten years' work on experimental and clinical lines, and brings forward new methods to elucidate the causation of obscure renal pain. A summary of the anatomical and physiological points bearing on their application to clinical practice is first given. As shown by the author and others, by the use of pyeloscopy and pyelometry, the renal pelvis, calyces, infundibula and ureter constitute a series of muscular contractile tubes which normally give a tracing of large waves, about five a minute of the pelvis. The author has constructed a realistic film of the contractions of the renal pelvis. Spasm of this muscular system causes pain, and other disturbances of function, such as anti-peristalsis or atony with dilatation, may be caused in various ways. The action of drugs, such as acriflavine, atropine, adrenaline, pituitrin and morphine, have been investigated both experimentally and clinically. This is a remarkable book and promises greatly to advance the scientific treatment of many forms of renal pain.

Mind, Medicine and Metaphysics: The Philosophy of a Physician. By WILLIAM BROWN, D.M., D.SC., F.R.C.P. Oxford University Press. London: Humphrey Milford, 1936. Pp. viii and 294. Price 7*s.* 6*d.*

THE Director of the recently-established Institute of Experimental Psychology in the University of Oxford and for fifteen or more years the Wilde lecturer in Mental Philosophy at Oxford and the successor of Professors G. F. Stout and W. McDougall, has done well to collect and publish fourteen addresses on psychological subjects and two appendixes on psychology in Oxford and on the psychology of war and peace. The first two chapters deal with psychotherapy and suggestion, the third chapter is devoted to psycho-analysis, and then the problems of sex control are discussed. Other subjects illuminated are sleep, hypnosis and mediumistic trance; self-determination and free will; psychology and religion; and the survival of personality. The Oxford Group movement, founded by Dr. F. N. D. Buchman, is carefully considered from a psychological point of view, and as a constructive criticism made with a background of deep sympathy the author hopes that the movement will undergo modifications which will bring the whole method more closely into line with modern psychotherapy.

The Practice of Ionization. By J. NEWTON DYSON, M.R.C.S., L.R.C.P. London: Henry Kimpton, 1936. Pp. xv and 178. Price 6*s.*

THE correct prescribing of the various forms of medical electricity is still neglected in most medical schools and Dr. Dyson's little book should do much to improve this position as regards one valuable variety of modern therapeutics. Dealing first with theoretical considerations Dr. Dyson then discusses the methods of application and the various disorders for which ionization is indicated, with notes on illustrative cases. Dr. E. P. Cumberbatch contributes a foreword commending this small volume so that practitioners may prescribe ionization intelligently.

The Nutritive Value of Fruits, Vegetables and Nuts. By R. A. MCCANCE, E. M. WIDDOWSON, and L. R. B. SHACKLETON. Medical Research Council, Special Report Series, No. 213. London: H.M. Stationery Office, 1936. Pp. 107. Figs. 26. Price 2*s.*

THIS valuable report, containing the results of an enormous amount of chemical analysis, is a continuation of the series of important investigations necessary for the satisfactory solution of nutritional problems, carried out at the Biochemical Laboratory of King's College Hospital, London, under the direction of Dr. McCance. In the first of the three parts, into which this monograph is divided, the methods of analysis are fully described. Part two begins with a review of the previous results of analysis of plant foods, and then gives in seven elaborate tables the results obtained by the authors. This cannot fail to impress the reader with the very thorough character of this research; thus, the amount of nitrogen soluble in 90 per cent. alcohol as well as that of the total nitrogen was determined in thirty-six representative fruits, vegetables, and nuts. Generally speaking, fruits do not contain any starch; but bananas are an exception, though most of it has been converted into sugar when the fruit is ripe. Many fresh fruits contain more than ten per cent. of sugar. The total amount of available carbohydrate in vegetables was found to range from none in mushrooms to 5 per cent. in dried split peas. Vegetables, as eaten, contain between 70 and 98 per cent. of water, and the wastage in some, such as 82 per cent. of asparagus and 66 per cent. of globe artichokes, may be very high, whereas some others, such as dried legumes, are entirely edible. Nuts are of special interest, as their composition is so different from that of fruits and vegetables; fat is present in large quantities in some, for example barcelona, brazil nuts and walnuts all contain more than 50 per cent., whereas chestnuts yield less than 3 per cent. Part three deals with the changes in chemical composition brought about by cooking. While considerable loss may be due to soaking in water, for example of chlorides in the case of potatoes in distilled water, they may gain calcium when very hard water is employed. Potatoes gain fat when fried.

Applied Dietetics. By FRANCES STERN. London: Baillière, Tindall and Cox, 1936. Pp. xxi and 263. Price 16*s*.

THE author of this comprehensive book is chief of the Food Clinic at the Boston Dispensary and assistant in medicine in the Tufts College Medical School. He is therefore closely in touch with modern dietetic problems and the result is a thoroughly practical volume. Certain tables at the end of the book really summarize its contents in an adequate manner for the expert but the preceding pages make the basic principles of dietetics and their application clear to the less experienced. Typical diets and menus are supplied and despite the disadvantage of the different food customs and nomenclature across the Atlantic this book will be found of great value in this country by those interested in the scientific application of the newer knowledge of nutrition.

Absorption from the Intestine. By F. VERZAR and E. J. McDOUGALL, Ph.D. London: Longmans, Green & Co., 1936. Pp. xi and 294, with 70 Illustrations, many of which are in colour. Price. 21*s*.

THIS well-produced volume is the latest contribution to the "Monographs on Physiology" series, edited originally by the late Professor Ernest Starling and now by Professor C. Lovatt Evans. Twenty-nine pages giving the bibliographical references testify to the completeness with which the authors have undertaken their task and the main problem has been to try to explain the facts of absorption from the intestine by physio-chemical laws. It is concluded that there is no need to invoke the occurrence of "vital forces," and hormonal influences appear to play their part by controlling synthetic processes in the epithelial cells thereby maintaining a high "gradient" necessary for the absorption of certain substances.Many of the conclusions have a wide biological application and physiologists will welcome this addition to their works of reference.

The British Encyclopædia of Medical Practice. Edited by Sir Humphry Rolleston, bt., g.c.v.o., k.c.b. Volume 2. London: Butterworth's Medical Publications, 1936. Pp. xxiii and 767. Price 35*s*.

Details of this notable contribution to British medicine were given on the occasion of the appearance of Volume 1 a few months ago. The present number ranges from "apraxia" to "carriers in infective disease" and contains over fifty monographs by recognized authorities. That on "arthritis" is one of the most comprehensive and six contributors have combined to cover various aspects of this subject. For dealing with "brain abscess" a most fortunate choice of Dr. C. P. Symonds and Mr. Hugh Cairns has resulted in a brilliant exposition of modern views on this subject. The volume contains over a hundred illustrations and fifteen plates, some of which are in colour.

Treatment in General Practice. Volume 2. London : H. K. Lewis & Co. Ltd., 1936. Pp. xii and 426. Price 10*s*. 6*d*.

This is a second collection of articles republished from the *British Medical Journal* and the sections include contributions on diseases of the nervous system, diseases of the digestive system, diseases of the blood and blood-forming organs, rheumatic diseases, diseases of metabolism, and diseases of the kidneys. Two articles on diagnosis have been included to illustrate points raised in the articles on treatment. The general practitioner should find this collection of articles of great value in his daily work.

A Medical History of Liverpool from the Earliest Days to 1920. London: John Murray, 1936. Pp. xx and 313, Illustrations 81; maps 2. Price 21*s*.

This beautifully printed and generously illustrated work, based on the data collected during the long period of thirty-five years by the late T. H. Bickerton, honorary oculist to the Liverpool Royal Infirmary, and edited by Mr. H. R. Bickerton and Dr. R. M. B. Mackenna, is the first published account of the medical history of Liverpool. It comes out at an appropriate time, for this year sees the celebration of the centenary of the present Liverpool Medical Institution's building, which is now one of the most venerable in the city, where, as the editors remark, ruthless destructions has been wont to fall upon old houses. This most interesting historical work is offered to the public at the low price of a guinea.

NEW EDITIONS

The Digestive Tract, by Alfred E. Barclay, o.b.e., m.a., m.d., m.r.c.p., d.m.r.e., with its sub-title "A Radiological Study of its Anatomy, Physiology and Pathology" has been issued in a second edition (Cambridge University Press, 36*s*.). It has been entirely re-set and there is evidence of extensive alterations in order to keep the work abreast of the rapid developments in this branch of medicine. Measurements are now given in international *r* units and some observations on cinematographic X-ray records have been included. The first edition was rightly recognized as the most important work on this subject then available and in its new form this volume can be cordially recommended to clinicians, radiologists and pathologists for the same reason.

Recent Advances in Endocrinology, by A. T. CAMERON, M.A., D.SC., F.R.S.C. (Churchill, 15*s*.). That a third edition in 1936 should follow the second in 1935 shows not only the rapid advances in endocrinology but also the wide recognition of the excellent review of the subject given by the professor of biochemistry at Manitoba University. This revision covers the new work brought out in 1935 and the early part of last year. A new chapter of eleven pages deals with the important researches of Rowntree and Hanson showing that the thymus and pineal are endocrine organs, and thus takes the place of two pages in the previous edition. Many other additions, especially on the gonads and Cuching's disease, have been made, but, although there are fifty additional pages and ten more illustrations, the price of this admirable volume remains unchanged.

Recent Advances in Allergy, by G. W. BRAY, M.B., M.R.C.P., has reached a third edition (Churchill, 15*s*.) and needs no introduction, for it has already achieved a wide popularity in this popular series. A slight increase in size has taken place and there is one new illustration. Many sections have been rewritten in addition to revision of each chapter.

Essentials of Physiology (Bainbridge and Menzies) is edited and revised by H. HARTRIDGE, M.A., M.D., SC.D., M.R.C.P., F.R.S., for its eighth edition (Longmans, Green & Co., 14*s*.), the third for which he has been responsible. New chapters have been added on the nutrition of the heart, on the oxygen-carrying power of the blood, on the vitamins, on tissue oxidation, on synapses and on pregnancy and parturition. Many other sections have been enlarged or revised and the popular tradition of this book among medical students will be maintained with this new edition.

The Operations of Surgery. Volume II.—The Abdomen. By R. P. ROWLANDS, M.S., F.R.C.S., and P. TURNER, B.SC., M.S., F.R.C.S., in its eighth edition (J. & A. Churchill, Ltd., 36*s*.), was heartily welcomed when Volume I appeared. For the present volume expert help has been obtained from Mr. W. H. Ogilvie, Mr. A. Ralph Thompson, Mr. G. F. Gibberd and Mr. R. C. Brock in various special branches and Mr. Philip Turner has undertaken alone the task of the final editing, for Mr. R. P. Rowlands died before the book was completed, having, however, already prepared certain chapters. A new section entitled "Some Recent Developments" has been included in this edition and the whole work is a worthy production of the Guy's School.

Aids to the Diagnosis and Treatment of Diseases of Children, by F. M. B. ALLEN, M.D., M.R.C.P. (Baillière, Tindall & Cox, 4*s*. 6*d*.), in its seventh edition, is likely to continue its reputation as a popular member of this series. The outlook is essentially practical and treatment is emphasised throughout.

NOTES AND PREPARATIONS

NEW PREPARATIONS

Calcium Aspirin Tablets.—Genatosan Ltd., Loughborough, Leicestershire, announce that they have now succeeded in preparing their well-known brand of soluble calcium aspirin in tablet form. Clinical reports on this useful combination of anti-rheumatic and sedative agents have been satisfactory and its use should be extended in the new convenient form. Tubes of 20 tablets are supplied separately or in boxes of 12 (price 6*s.* 6*d.*) or 24 (price 12*s.* 6*d.*). Each tablet contains 7 grains of calcium aspirin and the recommended dose is 15 grains three or four times a day for an adult.

Naphtolated Charcoal (Fraudin).—An active vegetable charcoal for which high absorptive powers are claimed is marketed in this country by Roberts & Co., 76, New Bond Street, London, W.1. It is a granulated preparation containing beta-naphthol (2 per cent.), wood charcoal (78 per cent.) and sugar (20 per cent.) The dose recommended is one or two teaspoonfuls three times a day after meals or as required and a tin containing 24 teaspoonfuls is sold at 2*s.* 9*d.*

"Salicylysin" Liniment and Ointment.—This contains 20 per cent. of glycol iodosalicylic ester, a new organic compound of iodine and salicylic acid in readily absorbable bases. It is claimed to be non-irritant, non-staining and almost odourless. Indicated in fibrositis, neuritis, articular and muscular rheumatic affections, these preparations are manufactured by Messrs. Allen & Hanburys Ltd., Bethnal Green, London, E.2. The prices are as follows :—Liniment—2 oz. bottle 2*s.* 6*d.* 4 oz. bottle 4*s.* 6*d.* Ointment—1 oz. tube 1*s.* 9*d.* 2 oz. tube 3*s.*

Streptocide.—This is the name given by Evans Sons Lescher and Webb Ltd., Evans' Biological Institute, Runcorn, Cheshire, to a preparation of *p*-aminobenzenesulphonamide. The value of this substance in streptococcal infections is now well established and streptocide can be used for oral administration in compressed tablet form, each containing 0·25 gm. Bottles of 25 cost 4*s.*, of 100, 13*s.* 6*d.* and of 250, 32*s.* 6*d.*

Testoviron.—This is a synthetic male hormone called testoviron propionate introduced by Schering Ltd., 185–192, High Holborn, London, W.C.1. It is indicated especially in prostatic hypertrophy and the suggested dosage is one injection of 5 mgm. twice weekly for six weeks followed by an interval of two weeks, after which the course is repeated according to clinical indications. Boxes of 4 ampoules each containing 5 mgm. are now available.

THE PRACTITIONER

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POST-OPERATIVE CARE: MEDICAL ASPECTS

By A. P. THOMSON, *M.C.*, M.D., F.R.C.P.

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As the supervision of post-operative convalescence has become the duty of surgeons there are now few physicians who can discuss the matter with the authority of intimate day by day experience. On the other hand a physician has a certain advantage, for in the course of years he sees the patients of many surgeons and is able to compare the different methods adopted to promote recovery. These methods vary surprisingly; as to the position in which the patient is to be nursed, for instance, or the amount of movement that may be allowed; at what interval after the operation drinks may be given and their nature and amount; whether rectal salines are necessary in all cases and whether they should contain glucose and bicarbonate of sodium; what should be done to relieve pain and induce sleep; how soon solid food may be taken; when it is safe to remove stitches. In these matters and in many others there is remarkable diversity of opinion and practice among surgeons of equal competence, and, inasmuch as their results vary but little, it is a fair inference that within limits the rules of convalescence should be flexible and adapted to the individual patient. It is not suggested that many surgeons consciously inflict a rigid routine on all their patients; what happens, however, is that a rigid routine is at times inflicted merely because no special directions are given. How great an infliction such rigidity may be patients alone know. Not many years ago the diet of the convalescent was determined by a strange confidence in the virtue of milk and slops. Many adults and some children dislike this diet intensely and, if there is no adequate reason to the contrary, the sooner they return to their ordinary food the better they generally are.

That satisfactory recovery from an operation depends largely on the technical skill with which it is performed is obviously true, but equally important are judgment in selection of the patient, the ability of the surgeon to refuse to do too much at one time—to remember that discretion may be the better part of valour—and finally, adequate preparation. In cases of emergency, preparation may be impossible, but no one who has witnessed the struggles of a surgeon with a monstrous abdomen in the course of an operation of convenience can escape the reflection that a preliminary period of sensible dieting might make convalescence less stormy and reduce the labours of nursing.

CARE OF DIABETIC PATIENTS

Particular care is necessary with diabetic patients, for adequate control may reduce their surgical risks almost to the level of those of average patients of the same age. At present I see no reason to modify the system of treatment that I introduced many years ago in my clinic at the General Hospital, Birmingham. The essentials are: (1) a fairly liberal carbohydrate diet of about 150 grammes with no restriction of protein or fat provided the patient maintains a weight a few pounds less than the average for his height and age; (2) insulin in two doses daily sufficient to control symptoms, to avoid acidosis, and to keep the varying blood sugar in the neighbourhood of 150 mgm. per 100 c.cm. Occasional or intermittent glycosuria does no harm. No change is made in the usual regime before operation. Three hours before the patient goes to the theatre 20 units of insulin are given and he takes a cup of tea or lemonade with 1 oz. of glucose in it. A rectal saline (10 oz. of 5 per cent. glucose solution in normal saline) is given one hour before operation. A further dose of 20 units of insulin is given as he leaves the theatre.

The chief dangers of the diabetic after operation are dehydration and ketosis. The first is combated by free administration of fluid—by the mouth as soon as possible and by the rectum if there is vomiting or if for any reason drinks cannot be given. The intravenous route is rarely necessary. The second danger—ketosis—is avoided by giving glucose freely and insulin in large and frequent doses. If ketosis persists, 20 units of insulin may be given every four or six hours with sufficient glucose after each injection to prevent insulin shock for several days if necessary. Glycosuria should be neglected until the patient is well enough to take his usual diet. As a test for ketosis the simple addition of liq. ferri perchlor. to separate specimens of urine is sufficient; the nitroprusside test is too sensitive. It should be remembered that pain and anxiety during convalescence may occasionally give rise to glycosuria in patients who are not diabetic and the discovery of a little sugar in the urine does not alone justify treatment for diabetes.

COMMON COMPLICATIONS

It is unfortunate that often but little can be done to diminish surgical risks in patients with other established systemic diseases. Myocardial insufficiency may be reduced by careful rest and graduated exercise when time and opportunity permit; hyperpiesis and simple valvular lesions rarely cause trouble.

Physicians, however, are usually asked to see patients after operation because an unforeseen complication interrupts convalescence, and an examination of my records of such consultations suggests a simple classification in the following groups in the order of their frequency.

(1) Cases of persistent fever.
(2) Pulmonary complications.
(3) Cardiovascular disorders and anæmia.

This list is incomplete; no reference is made, for instance, to the numerous nervous complications dealt with in a separate article in this issue; nor is the differential diagnosis between paralytic ileus and organic obstruction discussed or the treatment of post-operative vomiting, hiccough and distension.

CASES OF PERSISTENT FEVER

Even after clean operations moderate fever for one or two days is common, but persistence of a raised temperature for longer periods requires investigation. If local complications in the field of operation can be excluded, and the cause of the fever remains obscure certain simple possibilities should be considered. In some patients the shock of an operation disturbs the normal mechanism for regulating the body heat and seemingly trivial causes may have unusual effects. Too many hot-water bottles, excessive bed-clothes, an over-warm room, constipation (masked perhaps by spurious diarrhœa due to scybalous impaction), lack of sleep, and, in nervous individuals, simple mental distress and pain, have all at times been responsible for puzzling temperature charts. It is wise, however, not to accept any of such factors as the cause of fever unless a blood count shows that no leucocytosis is present.

In my experience persistent fever for no ovbious cause is especially common after *operations on the mastoid*, but it may be that as consulting physician to an ear and throat hospital I see an unduly large proportion of such cases and that my figures therefore are not representative of the average. The usual history is that after the operation, although the wound seems satisfactory and all local sepsis has been rigorously dealt with, high fever continues sometimes with symptoms of meningism or other intracranial involvement. In most of such cases the operation has been done while the patient is febrile and there is often a history of sore throat and fever for some days before the appearance of rather indefinite signs of mastoid disease. I believe that many of these patients have been victims of septicæmia from the beginning of their illness and that the operation has merely drained one local focus without influencing the underlying blood infection. In all cases of continuous fever after operations the possibility of septicæmia should be considered; if possible blood cultures should be made and should they prove positive further disturbance of the original field of operation should only be undertaken on the clearest evidence that it is likely to drain pus under pressure. A close watch must be kept for the development of local suppuration remote from the original lesion (for instance, about the joints) but again surgical interference should not be precipitate. Incision of an inflammatory area before pus has formed is commonly disastrous; in septicæmia local inflammatory changes wax and wane spontaneously in a remarkable way.

In the mastoid cases a physician is often asked to do a lumbar puncture "to exclude meningitis." The risks are considerable for there is both clinical and experimental evidence that meningitis may actually be induced by lumbar puncture in the course of septicæmia and it should hardly ever be done. In established meningitis there is no objection to lumbar puncture to relieve suffering: it is only justifiable for diagnosis in these acute cases in which there is reason to believe that meningococcal infection may be present.

The treatment of septicæmia is difficult and unsatisfactory. When the original infection has started in the throat moderate doses (not more than 20 c.cm. in an adult) of antistreptococcal serum (scarlatinal) should be given on two consecutive days, for it sometimes seems to do good: the results are not conclusive and I have never seen any benefit follow the use of serum in streptococcal septicæmia unless the original infection was in the throat. The new prontosil compounds may be tried. My experience is still too slender to justify an opinion of them; I have had, however, two seemingly dramatic successes. Blood transfusion, unless there is gross anæmia, is not of much value. I have tried immuno-transfusion (transfusion from a donor inoculated with a vaccine of the organism cultured from the patient's blood) on five occasions but no benefit followed. The essentials of treatment are rest and nourishment. Opium should be used freely.

Venous thrombosis is a frequent cause of persistent fever after operations, particularly after pelvic operations. Obvious œdema may not occur until the fever has lasted several days; three times early distension of veins on the abdominal wall has indicated the correct diagnosis when the rest of the physical examination was negative. The possibility of embolism renders a long period of immobility necessary in convalescence. I have known *thrombophlebitis migrans* to follow operations for "an acute abdomen" on three occasions. The course of these cases was prolonged—one did not settle down finally for eighteen months—but they all recovered completely. Each attack of thrombosis is associated with sharp fever and when the pulmonary vessels are affected the suspicion of embolus is bound to arise; the acute shock of an embolic attack does not occur however; pleurisy is often marked and may precede hæmoptysis by a day or two.

Bacillus coli infection of the urinary tract is responsible for some cases of persistent fever during convalescence. It occurs most often in women and the difficulty in emptying the bladder efficiently while lying in bed may predispose the patient to it but in many cases the infection has probably been present before the operation ; this complication, however, might be rarer if surgeons were not generally content with cursory testing of the urine to exclude the presence of albumin and sugar. Pre-operative microscopical examination of a centrifuged deposit should be a routine. The symptoms of frequency and pain on micturition may well escape notice for they are often slight while the patient is completely at rest. In the acute febrile stage treatment consists of a liberal fluid intake (at least six pints in twenty-four hours) and sufficient potassium citrate and bicarbonate of sodium in equal quantities to make the urine alkaline to litmus. A week after the temperature has fallen to normal treatment with mandelic acid should begin if the catheter specimen still shows infection to be present. Some of these post-operative cases, however, clear up quite well on alkalis alone and do not recur.

Subphrenic abscess seems now to be rare; I have met with only four cases in the past five years. In the early stages diagnosis may be almost impossible, even with the help of radiology, but a little delay, which permits the formation of satisfactory adhesions, is certainly preferable to premature blind explorations with large needles. In general such explorations should be avoided for fear of infecting clean spaces through which the needle is withdrawn after it has entered the septic area. A close watch on the bases of the lungs to detect the signs of elevation of the diaphragm, frequent leucocyte counts and careful observation of the position of the lower border of the liver are the principal clinical points in diagnosis; radiology is of the greatest help—particularly a screen examination which reveals reduced movement as well as upward displacement of one or other side of the diaphragm. Empyema is said to be a consequence of subphrenic abscess. It may be so, but in my experience (two cases) the pleural cavity has become infected after abortive explorations with long needles.

Of other causes of fever, three may be mentioned: (1) The "lighting up" of quiescent or unrecognized *pulmonary tuberculosis:* it is a tribute to the skill of anæsthetists and to the judgment of surgeons that this occurs so seldom in ordinary clinical practice. I do not refer, of course, to patients in whom the operation has been undertaken to relieve some tuberculous disease or to those in whom tuberculosis is first discovered by the surgeon. (2) The occurrence of *streptothrix infection* (*actinomycosis*)*:* I have notes of four patients all of whom had had operations for drainage of an appendix abscess by experienced surgeons and who subsequently remained febrile with discharging sinuses from which the streptothrix was eventually recovered. I was struck by the fact that inspection of the abdominal contents in the early stages did not suggest the underlying infection. (3) The occurrence at the *onset of a general infection* of symptoms of acute local disease that have led to surgical operations. Such cases are, of course, closely analogous to the septicæmic cases with early mastoid symptoms already mentioned. I have records of two patients (and I know of at least one other) in whom appendicectomy was performed at the onset of *typhoid.* In one case the surgeon himself suggested the correct diagnosis when the abdomen was opened owing to the general congestion of the intestine, in which the appendix shared; the other was disastrous, for the condition was not recognized until the man had been in a surgical ward for ten days, by which time two nurses and several other patients had been infected. Fortunately they all recovered after prolonged and severe illness.

PULMONARY COMPLICATIONS

I have not seen as many cases of post-operative bronchitis and broncho-pneumonia in recent years as I did formerly, and for this there are, I think, two reasons—the complication is not as common as it was owing to improvements in the administration of anæsthetics, and anæsthetists are gradually assuming the responsibility of the care of these patients. Respiratory infection may be the result of many factors; inhalation of septic material from the mouth or pharynx while the patient is unconscious, embarrassment of the descent of the diaphragm by abdominal distension or the pain of a wound, abolition of the cough reflex during convalescence by the indiscreet use of powerful sedatives, the presence, particularly in the obese, of bronchitis and emphysema or a feeble heart that readily permits congestion in the lesser circulation—all or any of these may be responsible for the "chesty" patient. Inasmuch as it is a far better course to avoid pulmonary complications than to treat them, it is wise whenever it is possible to clear up gross sepsis in the mouth and upper respiratory tract as a preliminary to operation; to reduce obesity by dieting; to do operations of convenience on patients with chronic bronchitis during the summer months when they are at their best, and finally to reduce all surgery to the necessary minimum during the course of pandemics of "influenza."

In the treatment of respiratory infection a stimulating expectorant such as ammonium carbonate in 5-grain doses in a little milk every three or four hours is valuable; steam tents, unless the sputum is very tenacious, are best avoided; there is no reason to smother the patient with extra clothing or enormous gamgee jackets. The temperature of the room should never exceed 70° F., and should often be 65° F.; nourishment should be by frequent small feeds and Sydenham's aphorism that "more importance should be attached to the desires and feelings of the patient provided that they are not excessive than to the doubtful and fallacious rules of medical art" would, if it were not so often forgotten, protect many unfortunate victims from the nausea of glucose drenching and the flatulence of milk and starch. Alcohol in moderate doses relieves mental distress and often induces sleep; when it fails, paraldehyde in large doses (one to two teaspoonfuls) is the safest sedative. The use of opium calls for care; if pain is so severe that a patient almost stifles himself rather than cough a small dose of omnopon will do much more good than harm; much moisture in the lungs in such circumstances suggests a combination of morphine and atropine.

Abdominal distension should be treated by suppositories and enemas reinforced by pituitrin and eserine if necessary. Frequent wrestling to keep a patient sitting upright does more harm than good; a half-recumbent position on the side is often the most comfortable.

For cyanosis oxygen by the nasal route or through an efficient mask is sometimes helpful; it should be tried and judged by its effect on individual cases. Some patients regard it as a sentence of death. For a feeble pulse adrenaline in 5-minim doses at intervals of three or four hours is the best stimulant. Digitalis, unless fibrillation is present, is best avoided; digoxin is the most valuable preparation for it may act quickly even when given by the mouth.

Embolic infarction of the lung is a tragic complication of convalescence; often the operation has been successful and recovery over a period of eight or ten days uneventful. Suddenly the patient, perhaps after a slight movement, gives a cry and falls unconscious in profound shock. In the severe cases death may follow almost immediately; in others life is prolonged for a few hours with distressing dyspnœa and cyanosis and of these heroic surgery may save an occasional life by embolectomy. In the milder cases, in which the embolus reaches the smaller branches of the pulmonary artery the preliminary shock is still severe; complaint of pain in the chest is common and usually within a few hours there is blood-stained expectoration. Physical signs are scanty; a patch of pleurisy may be found with an area of diminished breath sounds, but disturbance of the patient should be avoided and the back should not be examined. The only treatment possible is morphine to relieve pain and shock, complete quiet and warmth. It is reasonable to give a prophylactic injection of vaccine (300 millions pneumococci, 100 millions streptococci) in the hope of preventing the onset of pneumonia in the infarcted area.

Collapse of the lung after operation is, I believe, of two types, (1) massive collapse of obscure origin, (2) local collapse possibly due to obstruction of a bronchus by viscid secretion. The former is a dramatic complication that occurs most often within twenty-four hours of the operation; its onset is sudden with severe substernal pain, dyspnœa and cyanosis. Diagnosis is easy for the physical signs are striking—one side of the chest is almost immobile in spite of the dyspnœa, the heart is drawn over to the affected side and well-marked tubular breathing can be heard with the stethoscope over wide areas. High fever may follow, but in uncomplicated cases usually disappears in two or three days. The speedy recovery of the lung is often as remarkable as the sudden collapse.

For the immediate distress morphine should be given; oxygen is only necessary if the cyanosis and dyspnœa are severe. Venesection and removal of a pint of blood relieved the cyanosis in one of my patients after oxygen had failed.

Local collapse is insidious in onset; in seven cases the history has been identical. After the operation there has been a troublesome, but not alarming, cough, with viscid expectoration for three or four days. Fever, if present, is slight; respiration is but little hurried and, if no pleurisy is present, painless; the discrepancy between the relative comfort of the patient and the discovery of signs of consolidation of large areas of the lungs is the chief point in diagnosis. If pneumonia supervenes the sputum may become bloody and two of my cases developed bronchiectasis later. Treatment with a stimulating expectorant is usually sufficient. Inhalation of carbon dioxide has not seemed of much value.

Abscess of the lung may follow any pneumonic process, septic emboli, or the inhalation of septic material. It is most common after operations in the nose and throat. Diagnosis before rupture is rarely possible without radiological help, and even with it is often dubious. It may justly be suspected when the dyspnœa is disproportionate to the physical signs and when there is great toxæmia. Attempts to localize an abscess by needling do much more harm than good. A large number of these patients recover spontaneously by spitting up the abscess, and active measures to close a persistent cavity (by bronchoscopic douching or other surgical means) should be deferred for some weeks—but not indefinitely for fibrosis round the cavity may render subsequent surgical approach to it difficult.

CARDIOVASCULAR DISORDERS

Acute circulatory failure after operation is often fatal. It occurs most often in cases in which operations in the upper abdomen have been prolonged or in patients whose strength has been sapped previously by illness. On recovery from the anæsthetic the pulse is rapid and feeble; livid cyanosis appears and persists; the face and tip of the nose become cold—as do the hands if they are uncovered. The patient remains acutely conscious and is often restless; respiration is shallow and a little rapid; there is no severe pain. Death usually occurs within thirty-six hours.

For these distressing cases innumerable remedies are recommended; their very number proclaims their futility. It is reasonable to give oxygen, merciful, and I believe harmless, to give morphine. Alcohol, adrenaline, coramine and the host of "cardiac stimulants" seem for a few moments to restore a failing pulse but their value is at best doubtful.

Chronic cardiac failure with congestion is extremely rare after operation—even in cases with established valvular disease. *Auricular fibrillation* occurs occasionally and in general is readily controlled by digitalis. If no serious myocardial lesion exists these cases often revert to normal rhythm when convalescence is complete. *Coronary thrombosis* is rare except in diabetics, with whom it is a real operative risk. *Persistent tachycardia* is at times troublesome in convalescence that is otherwise normal. It is rarely of serious significance and is generally due to anxiety. General massage sometimes relieves it. After partial thyroidectomy it may indicate the necessity for removal of more of the gland. In rheumatic children, particularly after tonsillectomy, tachycardia should be regarded seriously; it may herald a relapse and cardiac infection. The sedimentation rate should be estimated and convalescence should not be hurried until it is either normal or is shown by repeated estimations to be diminishing steadily.

Post-operative *anæmia* is more frequent than is commonly thought. Hæmorrhage and a diet of milk and starch during convalescence may reduce the hæmoglobin to 65 per cent. and no suspicion of anæmia may be aroused from cursory inspection of the patient. With modern apparatus estimation of the hæmoglobin is so simple and rapid a procedure that it might well be made a routine examination after operation. Treatment with large doses of iron and a more liberal diet are all that is necessary. On several occasions I have known the hæmic murmurs, tachycardia and œdema of anæmia to give rise to the impression of some serious cardiac defect.

POST-OPERATIVE CARE: SURGICAL ASPECTS

By J. R. LEARMONTH, Ch.M., F.R.C.S.E.

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IN order to define the scope of this article, I have envisaged a situation in which a general practitioner is left "on his own" after a surgeon has performed an urgent operation on one of his patients. Even with this reservation the directions cannot be exhaustive, nor are those which I have had space to include meant to be dogmatic; but each has served well enough at one time or another.

SHOCK

When an operation is ill-borne, as a result of undue loss of blood or of the poisonous effect of toxins, the patient may leave the operating table in a perilous state. The clinical features of established shock include low systolic blood-pressure; a rapid, feeble, compressible pulse; short, shallow respirations; a pale, cold, clammy skin with livid finger-nails, and a subnormal temperature. There are three essential objects in treatment :—

(1) *To maintain body temperature.*—This is attempted by the provision of warm coverings, hot-water bottles, and if possible, warmth from electric-light bulbs; and the patient must be carefully protected during the journey from operating theatre to bed, the foot of which should be raised. Coverings must not interfere with the freedom of respiration. As bodily warmth is restored, the amount of external heat should be reduced, for it is possible to deplete the body fluids through sweating by the too prolonged use of the electric cage, a matter in which a nursing staff may need guidance.

(2) *To alleviate pain.*—A full dose of morphine should be given before the patient begins to recover from the anæsthetic, but not until provision has been made to introduce fluid.

(3) *To introduce fluid*, most usefully directly into the circulation the added fluid should be one which will remain within the blood vessels, for this there are available 6 per cent. gum-saline solution, which may be bought in ampoules ready for dilution, and compatible blood. The latter is better, but not often readily available in the circumstances under consideration. As a rule 600 c.cm. of gum-saline solution are given. In shock the superficial veins are collapsed and it is best, because quickest, to introduce the fluid after open exposure of a suitable vein. The fluid should be warmed to 105° F., and at first a "head" of about three feet is necessary. The "head" may be reduced when the solution flows more freely, and at least twenty minutes should be consumed in the administration of each 600 c.cm.

Fluid may also be given by rectum, and after an anæsthetic large quantities (1,200 to 1,800 c.cm.) are retained. My personal preference in these cases is for black coffee: 1,200 c.cm. of this, at a temperature of 105° F., may be introduced; the warmth of the fluid is perhaps as important as its composition. Large amounts such as this are contra-indicated in cases of gangrenous appendicitis: the increase in colonic tension may be too great for the friable cæcum, and a fæcal fistula may result.

POST-OPERATIVE HÆMORRHAGE

Only the most general directions can be given for dealing with this complication. It will be suspected if the patient shows increasing pallor, the rate of the pulse rises steadily, and blood appears on or through the dressings. The hæmorrhage is likely to be of the reactionary type: that is, it will appear within the first twenty-four hours, when a circulation, previously depressed, begins to recover its normal strength. Bleeding from superficial tissues may be checked by pressure if this is applied to the bleeding point. Thus an additional stitch will stop bleeding from the subcutaneous layers of a wound, and packing, or additional packing, hæmorrhage from a cavity. If an extremity is involved, a tourniquet may be used to supplement local pressure. In all cases a full dose of morphine should be given, and if necessary an intravenous infusion of gum-saline.

THE PROVISION OF FLUID AFTER ABDOMINAL OPERATIONS

This is required to make good insensible loss of water, which amounts to about 1,000 c.cm. in the first four hours after a major procedure, and to supply a normal fluid intake. When vomiting has been a feature of the illness, salt is also required to replace the resulting depletion of chlorides, and glucose to correct the altered acid-base equilibrium of the blood. Until it is possible (or desirable) to give it by mouth, fluid in adequate amounts must be given by other routes: by rectum, under the skin, or into a vein. For an adult of average size, between 3,000 and 4,000 c.cm. are necessary in each twenty-four hours; normal (0·9 per cent.) sodium chloride is the solution usually employed. Recently it has been pointed out that these amounts of saline solution contain from 27 to 36 gm. of sodium chloride, a quantity far in excess of the normal daily requirement (15 gm. = 1,700 c.cm. of 0·9 per cent. NaCl), and that "pushing" normal saline may actually do harm in certain cases by imposing an impossible load on the kidneys. The remainder of the required fluid, and the glucose, may be given as a 5 per cent. solution of the latter, and when this is given by the drip method there is no danger of overtaxing carbohydrate metabolism. Additional water may be given by rectal drip, and indeed tap water is less irritating to the rectum than is saline solution. Therefore an average programme for twenty-four hours might well be :—

Combined	0·9 per cent. saline	= 1,750 c.cm.	by rectum, subcutaneously, or intravenously.
	5 per cent. glucose	= 1,750 c.cm.	
Tap water		= 1,000 c.cm.	by rectum.

When vomiting has been prominent, the amount of saline-glucose solution can be increased. There are a number of forms of drip-apparatus on the market and one at least should form part of a practitioner's equipment: the same apparatus is used irrespective of the route of administration, and a usual rate is fifty drops per minute. The bowel should be washed out before the rectal administration of fluid; a catheter of medium size (e.g. no. 10) with an additional lateral eye is used. If its presence is irksome, a little anæsthesin ointment introduced into the anal canal on the finger will mitigate the discomfort. If the fluid leaks or is returned, the catheter is removed for three or four hours, and then replaced. Of all routes, the subcutaneous is the most suited to the needs and resources of the general practitioner. The apparatus requires no attention save refilling the reservoir and thermos bottle, and will continue to deliver fluid through the same punctures for two or more days. The needle (or needles if two are used) are inserted through intradermic wheals of 1 per cent. novocaine solution, in the anterior axillary line, deeply so as to lie below the pectoral fascia; and not into or under the breast, but directed towards the axilla. When they are in position they are covered with sterile gauze, and fixed by adhesive strapping. If 10 c.cm. of 2 per cent. novocaine solution is added to each litre of solution to be administered, discomfort will be absent or minimal.

DRESSINGS

As a rule a clean wound does not require dressing until the stitches are to be removed. Persistent discomfort in a wound after the first twenty-four hours calls for its inspection and redressing, for gauze caked with blood, a stitch tied too tightly, the ends of a stitch caught in and dragged by the dressing, or a blocked drainage tube may each be the source of the pain. In the case of septic wounds the dressing should be changed often enough to prevent staining of the bandage, or the forming of a sodden application to the surrounding skin. A convenient way of holding in position dressings that require frequent changing is shown in fig. 1. When the discharge has

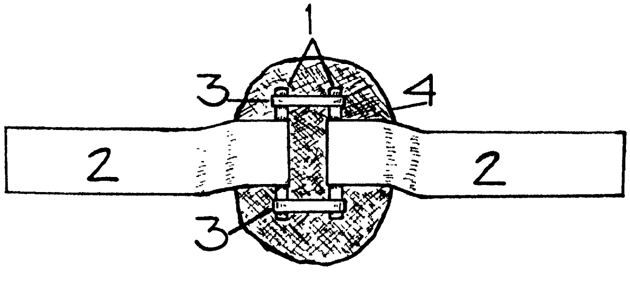

FIG. 1.—Method of fixing a dressing which requires frequent changing. (1) Glass rods. (2) Strips of elastoplast folded round glass rods, so that adhesive surface does not come in contact with dressing. (3) Rubber bands. (4) Dressing.

a foul odour, a useful plan is to sprinkle a layer of sanitas powder between the gauze dressing and the wool that covers this. The macerating effect of a discharge upon the skin can be minimized by protecting it with sterile vaseline applied either directly or on strips of lint.

RETENTION OF URINE

Patients should be asked to pass water in eight to ten hours, as if there were no possibility of their being unable to do so. Medical practitioners or nurses should never appear perturbed if first efforts fail, because this only introduces or increases psychological factors. Retention exists, and calls for treatment, in the following circumstances: (1) when the patient complains of vesical discomfort; (2) after fourteen to eighteen hours (depending on the intake of fluid) have elapsed without the passage of urine; especially if vesical discomfort may have been minimized or abolished, as after a spinal anæsthetic, when basal narcosis (e.g. avertin) has been used, or when frequent post-operative doses of sedative have been required; (3) after a somewhat shorter period, in cases in which distention of the bladder would distort the site of operation (pelvic operations), and (4) when small quantities of urine are passed at frequent intervals, because such frequency usually results from the overflowing of a distended bladder.

The following procedures may be tried:—

(1) Hot applications to the suprapubic region and/or to the perineum; (2) change of position: thus the patient may be turned to the semi-prone position, or allowed to sit up, or to hang the legs over the edge of the bed; (3) a small (300 c.cm.) hot (105° F.) enema may be given, and (4) a tray with the materials for catheterization may be left (without comment) at the bedside as a last resort. If these measures fail a catheter, preferably a small one (size 6–8), should be passed with the strictest surgical cleanliness; this should not be delayed too long, especially after spinal anæsthesia, because the vesical musculature, once stretched, recovers its tonus but slowly, and the bladder should not be required to contend with much

more than 400 c.cm. of urine; subsequently a catheter must be passed when distension is complained of, till normal micturition is established. I am sure that many patients are "left too long"; if the bogey of cystitis haunts the medical attendant, he may leave a small quantity of antiseptic (10 c.cm. of 5 per cent. protargol) in the bladder after each catheterization. A point of some importance in ward work is that patients awaiting operation should be unaware that a fellow patient has needed post-operative catheterization; "retentionitis" may spread through a ward, especially a female ward.

HICCOUGH

The possibility of this troublesome complication being a sign of renal failure must first be considered. This eliminated, there may be tried (1) a rather larger dose of morphine (e.g. gr. 1/3 into cases where gr. 1/4 would usually be prescribed; (2) atropine sulphate gr. 1/100 hypodermically; (3) the swallowing of fragments of chipped ice; (4) in cases associated with nausea, washing out the stomach through a Ryle's tube; (5) inhalation of a CO_2-O_2 mixture; if a cylinder of this is not available, the patient may rebreathe into a grocer's large paper bag, held tightly (by himself) round the nose and mouth.

POST-OPERATIVE PAROTITIS

This dangerous complication may appear (1) in cases in which it has been necessary to withhold fluid by the mouth, (2) in cachectic or debilitated patients, and (3) in patients with frank intra-oral infection, e.g. of the teeth. If feared, it may be guarded against by mouth washes, of which the most useful is warm half-strength peroxide of hydrogen, and by giving chewing-gum or acid drops to suck. When it is established, antiphlogistine heated until it is only just bearable should be applied under jaconette, the application should be kept hot by an india-rubber hot-water bottle, and the hygiene of the mouth should be maintained. If the swelling persists or is increasing after three days of such treatment, an incision through the skin only should be made behind the angle of the jaw, the pus evacuated by a dressing forceps, and the finger of a rubber glove inserted for drainage.

ACUTE DILATATION OF THE STOMACH

This complication may appear a day or two after laparotomy. As a rule it is characterized by the effortless vomiting of large quantities of greyish or brownish fluid, but occasionally vomiting is absent. The abdomen becomes distended, the pulse-rate quickens, and the respirations are embarrassed. The diagnosis is confirmed by the passage of a Ryle's tube, which withdraws large quantities of fluid and often air; and the tube should be passed on suspicion, for the condition is a very urgent one. The Ryle's tube should be left in position to maintain continuous drainage; to facilitate this the patient is turned on the right side and the foot of the bed is raised. Normal saline solution is then administered by the continuous drip method by rectum and/or subcutaneously in order to make up the loss into the stomach of fluid and chlorides.

"BURST ABDOMEN"

Separation of the edges of an abdominal incision demands prompt treatment by the practitioner. This complication may occur (1) when the patient is elderly or debilitated and (2) when unusual strain (e.g. from intestinal distension) is put upon a wound inflicted to deal with a suppurative intra-abdominal condition. It leads to rapid deterioration in the patient's condition, and on inspection of the wound loops of bowel may be found under the dressings; or if the skin-stitches hold, the wound will be bulging, resonant on percussion and with a copious serous exudate escaping between the stitches. The wound is covered with a sterile towel, and re-sutured in the operating theatre as soon as possible. The skin of the abdomen is disinfected, the escaped loops washed with saline, replaced, and held in position by a moist pad. Tractor stitches of strong silkworm gut are then placed at each end of the wound, beyond the original incision. Beginning at the upper end of the wound, the operator raises the abdominal wall by the tractor stitch, and passes a stout suture through all its layers on both sides. This is tied and in turn used as a tractor, the through-and-through stitches being inserted at intervals of half-an-inch. The pad is withdrawn before the last stitch is tied. Re-suturing may be carried out alone with the aid of spinal anæsthesia. If circumstances prevent the use of sutures, the loops of intestine are washed, returned under a moist pack, and the abdominal wound closed with adhesive strapping as closely as possible round the pack.

CARE OF THE BOWELS AFTER LAPAROTOMY

Even in "clean" cases in the first twenty-four hours there may be complaint of pain from the accumulation of gas. This may be relieved by the passage of a rectal tube, or if this fails by a small glycerin enema (glycerin and water, of each two ounces). Normally this enema is withheld till the morning of the second day after operation, and on the morning of the third day a laxative is given by mouth (half-an-ounce of castor oil: or if the patient has a "favourite" laxative, an adequate dose of this). If peritonitis has been present the bowel should be left alone unless progressive distension is present; in favourable cases, after two or three days a spontaneous movement often occurs, aided perhaps by a glycerin enema. Embarrassing distension may be relieved (1) by the insertion of a rectal tube; (2) by the application of large hot dressings to the whole abdomen; (3) by the intravenous injection (50–100 c.cm.) of hypertonic (15 per cent.) saline solution; (4) by the intramuscular injection of a combination of pituitrin (1 c.cm.) and eserine (1/100 grain) followed after fifteen to twenty minutes by a glycerin enema, and (5) in extreme cases by the giving of a spinal anæsthetic. These measures are suitable for the paralytic type of ileus which may be present with or follow peritonitis, and which leads to a rapid deterioration of the patient's condition, in particular to a rising pulse-rate and in the late stages to regurgitant vomiting. Its characteristic features are its appearance soon (within a day or two) after operation, the absence of colicky pain, and the stillness of the abdomen on auscultation (absence of peristalsis). In addition in this condition the stomach must be kept empty by an indwelling Ryle's tube. Somewhat later after operation (after four days or so) although the bowels may have been moving regularly, mechanical obstruction of the intestine may occur as the result of the formation of adhesions, bands or kinks. This type is characterized by attacks of painful colic, and by the gurglings heard on auscultation of the abdomen. The diagnosis is confirmed by the administration of an enema; and if a second enema, two hours later, does not produce any result, arrangements must be made for the abdomen to be reopened. At any time before one accepts "enema evidence" a rectal examination must be made: sometimes the difficulty can thus be traced to fæcal impaction requiring breaking up, after which the bowels can move.

POST-OPERATIVE INFECTION

Superficial infection gives rise to pain in the wound, and complaint of this is an indication for dressing. A stitch abscess clears up promptly when the stitch is removed. In more extensive infections there may be signs of systemic reaction, the wound is swollen, red and hot, and the stitches appear too tight. In such cases one or two stitches should be removed, and the wound edges separated sufficiently to give exit to any pus. A watch must be kept on catgut ligatures or sutures, and these should be removed as they become loose. For the first few days hot fomentations form the best dressing; but they must be kept hot by some form of external heat, for example, an india-rubber hot-water bag. Unless used in this way, or changed very frequently, hot fomentations rapidly become cold compresses and defeat the purpose of their application by preventing rather than producing hyperæmia. Later a dry gauze dressing is best.

After certain abdominal operations, for example, the removal of a gangrenous appendix, residual abscesses may form in the peritoneal cavity. These are most common in the pelvis, and in the neighbourhood of the abdominal wound. Their formation may be signalled by a rise in both pulse-rate and temperature, or fever may be absent. Pelvic abscesses often give rise to diarrhœa and rectal tenesmus, and to vesical irritability; and their presence is confirmed by rectal examination. Abscesses near the abdominal wound may not give rise to signs of superficial inflammation; but there is local deep tenderness, rigidity, and a mass may be seen or felt. The appearance of an intraperitoneal abscess does not call for urgent action on the part of the practitioner; but the attending surgeon should be informed.

REMOVAL OF DRAINS

When a drain has been used to prevent the accumulation of blood or exudate (e.g. after nephrectomy or cholecystectomy), it may be shortened on the second and third days, and removed on the fourth. If a drain has been left down to, but not through the peritoneum, it can be removed on the fourth day if there is no purulent discharge. Drains evacuating intraperitoneal abscesses must remain longer in position; such a drain is usually a tube, or a number of soft rubber tubes (e.g. colostomy tubing) may have been used. In order to clear its lateral apertures, a tube should be twisted daily after the second day, and shortening may be begun on the fourth or fifth day. Shortening must be gradual, especially when the abscess has been deep in the pelvis, for too rapid withdrawal may leave pus locked in the depths of the wound, and a residual abscess may form. After the fourth day such tubes may be removed, cleansed both outside and inside, shortened one-half inch, and replaced; it is best to place the "guardian" safety-pin a constant distance from the external end, and to shorten this, as one may make an inaccurate estimate of the length of tube left in the sinus. When a number of soft rubber tubes or strips have been used, one may be removed completely each day after the fourth, the final strip being removed gradually. On the rare occasions when it is necessary to use a gauze strip as a tampon, it should be left for five or six days, as after this interval its removal is much less painful, and disturbs local relations less; if the gauze has been the only drain, after its removal a tube of small calibre should be placed in the sinus, and this must be shortened gradually.

REMOVAL OF STITCHES

In facial wounds removal of stitches should be begun on the second day and completed by the fourth, any under slight tension being left to the last. After laparotomy, in the average case, stitches may be removed about the tenth day; exceptions are the following : (1) in elderly, debilitated, or cachectic patients the wound takes longer to heal and stitches should be left for fourteen days to guard against separation of the edges; (2) stitches should be left in position until distension has been controlled; (3) in fat subjects the relaxation stitches should be left in position longer, to secure healing of the fat and so to prevent stretching of the scar; and (4) a stitch should be left above and below the point of exit of a tube draining purulent material. Where stitches take a small bite (e.g. on the face) the ends should be cut long so that they may be easily grasped by forceps for their division and removal. All stitches should be rotated before division, so that the point of section is below the previous skin level; this avoids the discomfort of dragging the tiny hook upon the cut end through the tissues (Fig. 2). After removal of stitches a wound may be reinforced by adhesive strapping; this must be flamed on both sides, in a spirit lamp or Bunsen burner. The portion immediately over the scar should be narrowed by folding the strapping so that adhesive surface is not in contact with the wound.

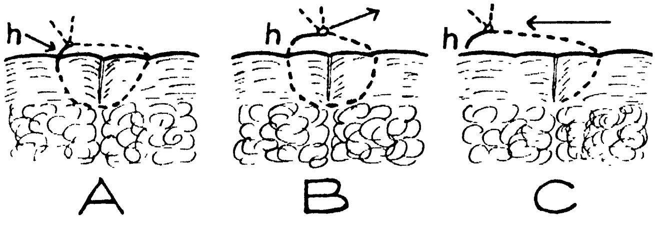

FIG. 2.—Method of removing stitches. (A) Stitch in position showing (*h*) the hook. (B) Stitch rotated so that it may be divided below the hook. (C) Removal of stitch, the pull tending to keep the wound closed. Arrows in (B) and (C) indicate direction of pull.

POST-OPERATIVE CARE : ANÆSTHETIC ASPECTS

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IN considering the subject of post-operative complications it is difficult to dissociate the effects of anæsthesia from those of surgery. It is frankly admitted that in many cases these complications may be due to the anæsthetic or its mode of administration, but as anæsthesia is invariably accompanied by surgical interference of some kind it seems fair to divide the responsibility between the chief parties concerned. This contention is worthy of consideration since the more serious post-operative complications commonly occur after severe operations. Another aspect of this problem deserves mention here, namely post-operative pulmonary disease. As surgery developed, a closer examination of all the factors concerned in producing post-operative effects necessitated a modification of the view that, say, pneumonia following operation was exclusively the result of the anæsthetic; and it is now realized that trauma, post-operative pain, or a pre-existing state of upper respiratory tract infection or of lowered resistance, may also be responsible.

The treatment of post-operative complications is in the first instance preventive. Prevention entails careful judgment of the patient's condition, careful selection of a combination of agents, and of a method of administration suitable for the particular operation, skilful administration, and careful supervision on return to bed. To say that a patient " has taken an anæsthetic badly" is as often as not an admission that one or other of these factors has been overlooked. A further condition demanded is an a-traumatic surgical technique. Tearing of the muscles, and forcible traction on viscera give rise to states for which anæsthesia is apt to be unjustly blamed.

It is well to realize that with the exception of anæsthetics which are strictly local in action, all the agents employed are depressant in their effects upon the human organism: some are actually destructive. When there is superimposed upon this depression the results of surgery, comprising wide exposure of tissues, trauma, shock and hæmorrhage, it is apparent that the assessment of the patient's ability to withstand this concerted assault is of supreme importance. The ideal aimed at should be delicate surgery and light anæsthesia, the excellent effects of which are borne out in practice by unexpectedly successful results in elderly or gravely ill patients.

There exists in every individual what may be called a physiological balance. In youth and in the healthy this balance is elastic within a certain range. In old age and in the presence of disease, on the other hand, the degree of interference tolerated is greatly diminished. Nor must it be forgotten that, unlike the laboratory animal, the human subject is not a standardized product. Even in health environment, temperament, and habits of life are striking factors in the make-up of the individual. The importance of estimating the patient's condition in this way is greater when non-volatile drugs are employed for, while easily administered, they are irrecoverable and incapable of control when once given.

Two other points require mention before a detailed consideration of post-operative after-care is made—basal anæsthetics and physical fitness. The agents employed as basal anæsthetics are not universally applicable as complete anæsthetics in themselves and frequently require supplementary measures. Herein lies the danger. It may be easy enough to administer ether by itself, for the margin of safety is wide, but combination of this anæsthetic with basal agents is an undoubted handicap to an anæsthetist accustomed only to the administration of ether alone. The demand for basal anæsthetics is an ever increasing one, and their application is often left in the hands of the inexperienced. No one will deny that, administered in such circumstances, basal anæsthetics have called forth much hostile criticism.

Finally, it is obvious that every patient who comes to operation should be in as fit a state as possible. It is particularly important to bear this in mind when it is remembered that nowadays a number of women make a practice of dieting in order to keep slim. This often leads to under-nourishment and may, if the operative interference is serious and prolonged, be followed by dire consequences, owing to the patient's depleted reserves. A simple and nutritious diet should be insisted upon for a few days prior to operation, but this does not mean that alcohol or tobacco, if usually taken, should be forbidden.

Below an attempt is made to examine post-operative complications from the anæsthetic standpoint, and to show that given a co-operative surgical team these undesirable after-effects may be prevented in the first instance in some cases, though their avoidance in every instance is naturally beyond the anæsthetist's control. When such complications arise from the anæsthetic suggestions for treatment will be given.

OBSTRUCTION OF THE AIRWAY

When an operation is over it is the anæsthetist's responsibility to ensure the safety of the patient before removal to bed, and to be certain, as far as possible, of the competence of the nurse in charge during the period of recovery of consciousness. It is at this time that alarming events are liable to occur, for which unskilful management (and not the anæsthetic) is to blame. The commonest occurrence is partial or complete obstruction of the airway due to dropping of the jaw or of the tongue, or to vomiting. In such an emergency an incompetent nurse may leave the patient in order to summon help and in the meantime cyanosis may have developed to an alarming degree. The simple procedure of supporting the jaw, which any nurse is capable of performing, is often all that is required to achieve a clear airway. It is to be regretted that many nurses are unable to differentiate between *efforts* at respiration and the actual occurrence of free ingress and egress of air in the patient's respiratory passages. Sometimes all the accessory muscles of respiration may be at work in the endeavour to effect the entry of air without result; at other times, with a completely unobstructed airway, the respiratory excursions may become shallow, though perfectly sufficient for the needs of the patient at this period. Thus the alarm may be given (1) because the patient is breathing but " black," or (2) because he is "not breathing," though his colour is good.

The anæsthetist must take every precaution as soon as the operation is over to keep the airway free. When there is no surgical contra-indication this can generally be accomplished by placing the patient as far as possible in the lateral position with a pillow behind the shoulders, or preferably in the semi-prone position. This prevents the tongue from falling backwards and facilitates the expulsion of vomitus. Should any tendency to respiratory obstruction still exist with the patient in such position, an artificial airway may be used ; but tongue forceps of any kind are better avoided. If, in the case of an emergency, the tongue has to be drawn forwards, a right-angled tongue depressor or the handle of a tablespoon causes no trauma and is equally effective.

When a wide-bore rubber endotracheal tube has been employed during the operation, it is frequently both convenient and safe to leave it in position until the cough reflex has returned; but it must be remembered that if vomiting occurs after the protection offered by positive endotracheal pressure, or a throat pack, or an inflatable tracheal cuff, has been withdrawn, there is a risk of vomited matter entering the wind-pipe during inspiration. This will be minimized by the patient being in the lateral or semi-prone position. When an intranasal tube is employed, the possibility of occlusion by clenched teeth is avoided.

RESPIRATORY DEPRESSION

Apart from the obstruction factor, and when the airway is quite free, the significance of shallow respiration may frequently be exaggerated. In deep sleep snoring (which is nothing less than partial respiratory obstruction) causes increased frequency and depth of breathing, whereas the breathing is quiet or even shallow when the airway is completely unobstructed. When general anæsthetics are administered without carbon dioxide absorption (or, in fact, when there is an accumulation of this gas from re-breathing) during the course of the operation, respiration is frequently stimulated. As a natural sequence withdrawal of this stimulation causes a certain degree of respiratory depression, which can be observed after so-called open ether given without any preliminary medication other than atropine. When, on the other hand, a basal anæsthetic such as avertin has been given beforehand, its damping effect on respiration may be evident after the action of the supplementary agent has worn off and may last for some hours. If the dose of basal anæsthetic has been regulated with due care, however, every consideration having been taken of the state of the patient and the gravity of the operation, respiration in the immediate post-operative period should show no diminution in rate and amplitude beyond that which occurs in normal deep sleep. If cyanosis occurs when the airway is patent, and no surgical cause is responsible, the dose of the basal anæsthetic has probably been misjudged.

Treatment in such cases aims at increasing the metabolic rate and detoxicating the basal agent. Carbon dioxide and oxygen should be given at intervals, together with coramine, icoral, or lobeline. Coramine appears to be as efficient as any of the remedies which can be injected. When the gravity of the symptoms demands an immediate effect the drug should be given intravenously in doses of from 1 to 4 c.cm.

Opium derivatives in any form are contra-indicated in the presence of respiratory depression. After avertin, it is in any case good practice to avoid them until consciousness has fully returned. This precaution is worthy of particular stress. The well-meaning practitioner, who is anxious that his patient should know neither pain nor discomfort (abetted by the night nurse who is anxious to be undisturbed) contributes nothing to the patient's welfare by giving an opiate before avertin is fully detoxicated.

CIRCULATORY DEPRESSION

Apart from a state of acute shock or collapse, which is mentioned below, a mild degree of circulatory depression is not uncommon when a patient is put back to bed, but the degree of depression is consistent with the accompanying degree of slight respiratory depression which follows withdrawal of the stimulation provided by the supplementary anæsthetic. It is no cause for alarm, and corresponds, in fact, to the conditions obtaining in deep sleep. It must not be forgotten that the progressive elimination of the anæsthetic, which is taking place at this period, also contributes to the occurrence of some circulatory depression by allowing pain stimuli to "get through" to the brain.

Treatment is indicated only in the aged and debilitated in order to prevent stasis in the pulmonary circulation, i.e. carbon-dioxide-oxygen administration, coramine, ephedrine, and saline per rectum.

SHOCK AND COLLAPSE

As a general rule shock and collapse are attributable to anæsthesia when the depth of narcosis is insufficient for the surgical procedure. From this it must not be deduced that the deepest general anæsthesia prevents shock, since afferent stimuli are still received. Light anæsthesia is frequently confused with a condition in which the patient is merely lightly unconscious and immobile, but not actually anæsthetized. In the latter circumstances shock is rightly attributable to the anæsthetist. Operations of any magnitude should be performed under light anæsthesia only when the reception of afferent impulses is prevented by nerve block, as pointed out by Crile.

The *treatment* of shock is a matter of cardiac and respiratory stimulants, raising the foot of the bed, and applying warmth, and fluids. If the oral route is barred, saline is better given per rectum (by the drip method) than intravenously. When neither rectal nor oral routes can be made use of, and the shock is severe, blood transfusion may be required. As this comes within the province of the surgeon I make no more than a passing reference to it, nor to W. Wallther's[1] interesting practice of using plasma transfusion, which he regards as the ideal in this indication. One important point is frequently forgotten when fluid therapy is being considered—namely, that if fluid is given by the alimentary route (oral or rectal) the body is better able to regulate its rate of absorption and to reject the excess if necessary.

POST-OPERATIVE DISTENSION AND URINARY RETENTION

Without going into etiological details it will suffice to say that the vicious circle of post-operative distension occurs when the patient has fully recovered from the anæsthetic. It is therefore illogical to lay the blame on an agent or agents already eliminated. In the treatment of the condition, suction by duodenal tube should be instituted when simpler remedies, such as turpentine enemas, and the use of flatus tubes, eserine, and pituitrin have failed.

C. H. Pratt[2] gives a good account of its use during operation. A duodenal tube is passed into the stomach and remains *in situ* during the operative interference, suction being provided by syphonage. This makes the surgeon's work considerably easier during upper abdominal operations, and, left in place after the operation, and subjected to aspiration at indicated intervals, secures the prevention of secondary distension.

Retention of urine is comparable in its mechanism to the state of affairs present in abdominal distension when there is inability to relax the anal sphincter. It is significant that retention follows operations such as herniotomy—irrespective of the type of anæsthesia—more frequently than those performed elsewhere. Abdominal distension, similarly, occurs to a lesser extent when the site of operations is not the abdomen.

VOMITING

A certain amount of nausea and vomiting is not uncommon during the period of recovery from unconsciousness. So far as the anæsthetic is concerned this vomiting is generally of a transient nature, and by the use of "basal agents," supplemented by some non-toxic substance such as nitrous oxide and oxygen it is generally absent. Swallowed blood, ejected by the stomach as a foreign body can, of course, hardly be considered as an "anæsthetic aspect" of post-operative after-care.

The anæsthetist's concern is with the vomiting which may be classed as either (*a*) nervous, or (for lack of a better term) (*b*) true anæsthetic vomiting. Many patients—and an accurate parallel may be made here with some cross-channel passengers—make up their minds that they are going to be sick. For these, the nervous class, little or nothing can be done; retching may even commence before preliminary medication has been given, a previous experience of anæsthesia often contributing to its appearance. Midway between this nervous type of vomiting and the more serious "true" vomiting comes that due to sedative drugs such as morphine, and is explainable on the basis of idiosyncrasy.

True anæsthetic vomiting is a different matter altogether, being part of a vicious circle characterized by a gross upset of acid-base equilibrium. The patient, unable to retain fluid by mouth, is in a condition of dehydration resulting in acidosis and calling for energetic treatment. Most vomiting which persists for longer than eight hours may be classed in this category.

A detailed consideration of "acidosis" is out of place here, and it will suffice to say that following all inhalation anæsthetics (and even local ones) a diminution in the alkali reserve, accompanied by an increase in the urinary acidity and ketonuria, occurs. Patients in whom this state of acidosis exists before operation—as in the old days of pre-operative starvation—become worse afterwards and its occurrence cannot in all cases be prevented by prophylactic administration of sodium bicarbonate, glucose and insulin. A significant fact is that Rawdon Smith[3] found that the incidence of post-operative vomiting was reduced to one-half by giving glucose 2 ounces *plus* insulin 5 units before operation and glucose 4 ounces (per rectum) and insulin 5 units afterwards.

An important factor in preventing post-operative vomiting is the use of a well-balanced anæsthetic prescription. In the first place it must not impose too heavy a burden on the organism as a whole and, secondly, it must be chosen with a view to the peculiarities of any given case. The surgeon's demand for a routine anæsthetic—"I always have avertin for *all* my cases"—cannot be too strongly deprecated. "Well-balanced anæsthesia" comprises a suitable dose of a selected basal narcotic followed by nitrous oxide and oxygen—avoidance of ether and chloroform if possible, and otherwise the use of only a minimum quantity of these supplementary anæsthetics. Cyclopropane, which, according to Wesley Bourne, is the only anæsthetic not impairing the liver's function, bids fair to replace chloroform and ether entirely in this respect.

When vomiting occurs in a severe form the treatment is as for shock—fluid therapy, together with glucose-insulin as described above. A number of other remedies may be employed in the less serious case. Drinks need not be forbidden: sodium bicarbonate and water, or tea with lemon. Ice, however, should not be allowed. Barbiturates may be used—chloretone and nembutal suppositories—while a few drops of adrenaline in water flavoured with peppermint is often successful.

PULMONARY COMPLICATIONS

Of all the anæsthetics which have been blamed for pulmonary complications ether has been given the greatest prominence, despite the fact that they are equally common after spinal anæsthesia. The reason for this lies in the extensive use of ether the world over since it became established as a relatively safe anæsthetic. It is probable also that the impunity with which deep anæsthesia can be induced for the immediate needs of surgery has led to much indiscriminate, and frequently needless saturation of the patient. The "deepest possible" anæsthesia obtainable with ether still remains the ideal of many surgeons. It has been shown that the nature and duration of the operation have as great a bearing on the incidence of post-operative pulmonary complications as the anæsthetic used. Thus the incidence of pulmonary complications is relatively high in upper abdominal and relatively low in pelvic operations.

The depth of anæsthesia required in the case of an upper abdominal operation subjects the pulmonary bases to a period of inactivity from which only the robust patient can escape unharmed. When this inactivity is prolonged, as it is during recovery from deep ether, the risks are further increased. When consciousness has returned active respiration is impeded by pain which necessitates the use of opiates—themselves respiratory depressants. These factors combine to bring about conditions favourable to pulmonary complications.

How can the anæsthetist contribute towards the prevention of these complications?

(1) By balancing the anæsthetic prescription (see section on vomiting, above) in accordance with the type of patient and the nature of the operation. In old people and bad risks pre-anæsthetic medication when both long in duration and depressant in effect, must be avoided. A barbiturate which is rapid in action and detoxication is preferable, in small doses, to avertin. The supplementary anæsthetic should be nitrous oxide and oxygen, but only as far as this combination is

capable of satisfying surgical requirements without producing cyanosis. If muscular relaxation is required, as in high abdominal operations, a field-block of the abdominal wall can be carried out: failing this, cyclopropane may be substituted for nitrous oxide. "High spinals" should be avoided in old people, but if spinal anæsthesia is especially indicated let it be limited to a low block.

(2) By maintaining throughout the operation free respiration of normal amplitude and rate, and by preventing the entry of blood or vomited matter into the trachea.

(3) By avoiding undue exposure of the patient in the theatre—especially exposure of extensive raw areas, as in amputation of the breast.

(4) By securing (as already indicated) a free airway at the end of the operation.

(5) By maintaining the rate and amplitude of respiration after the operation by means of carbon dioxide mixed with oxygen and coramine. Administration of these should be repeated, at intervals if necessary, until the patient is fully conscious. If there is no surgical contra-indication, a change should be made from the supine position. The patient may be moved from one side to the other at intervals without causing undue disturbance. Opium should be withheld until the necessity for it is absolute, and even then the dose should be small. It is easy, and safer, to repeat a small dose as the need arises.

MINOR COMPLICATIONS

The post-operative complications dealt with in this section comprise a heterogeneous collection which, though of relatively small importance, commonly require attention.

Sore throats and pharyngitis.—Endotracheal anæsthesia occasionally gives rise to a sore throat which must now be recognized as a special sequel of this form of anæsthesia. Considering the increasing use of the method, the incidence of this complication is comparatively small. The sore throat is usually of short duration and of insignificant severity, though at times a patient may complain of it for several days. Rarely it is accompanied by aphonia which may persist for a week. Trauma is the cause, and is therefore avoidable. The more experienced the anæsthetist becomes in intubation technique the smaller is the incidence of this complication. The complaint may be localized *in the larynx*, in which case hoarseness is a feature. Occasionally it is sublaryngeal and accompanied by mild tracheitis with some cough and sputum. The latter occurs most frequently following operations for goitre which involves manipulation of the trachea. It is obvious that attempts to pass the tube when the glottis is closed will excoriate the mucous membrane, though it is significant that when the tube has been introduced into the trachea with precautions against trauma and has been well lubricated with vaseline, sore throat rarely follows operations performed in regions of the body other than the head and neck. The mucous membrane, which may be unduly desiccated from atropine injection or from other causes, should be swabbed with sterile paraffin as a routine measure.

Pharyngitis and ulceration of the soft palate and fauces result from excoriation by the speculum or from forcible introduction of dry gauze packing. Painful swallowing is the chief symptom. When the trouble is located in the larynx or trachea, inhalation of friar's balsam from an old-fashioned steam inhaler is a useful remedy. Painful swallowing and ulceration of mucous membrane respond well to a gargle of potassium chlorate, carbolic acid and glycerin. Aspirin tablets are also useful as a local remedy.

Conjunctivitis.—This results from irritation from ether, from drying up of secretions from atropine, and from trauma by the anæsthetic mask. It should always be avoidable. Cases of exophthalmic goitre require special care.

Post-operative backache.—This follows the stretching of the lumbar and sacral ligaments and causes much tribulation. The lumbar convexity should be suitably supported when the patient is on the operating table.

Restlessness has been widely attributed to basal anæsthetics. It is well to remember, however, that it is not uncommon after ether anæsthesia when no basal drug has been used. Post-operative restlessness of a violent nature is more common in children than in adults. It follows barbiturates such as nembutal more frequently than avertin. In adults troublesome restlessness is nowadays unusual after barbiturates, owing to the rapid detoxication of agents, such as pentothal and evipan. Children who can be persuaded to swallow may be given chloral hydrate with good effect (1 grain in syrup for each year of age.) If swallowing is impossible the only alternative is a hypodermic injection of morphine. Extreme restlessness indicates a high metabolic rate, so that a suitable dose of morphine is not contra-indicated in such circumstances.

SPINAL ANÆSTHESIA

When a spinal anæsthetic is given there is a danger of a fall of blood pressue. A danger of respiratory failure results from a combination of this factor with paralysis of the accessory muscles of respiration. Some of the anæsthetic substance is, of course, absorbed into the blood stream.

Preventive measures against the complications following "spinals" consist of the injection of ephedrine (some anæsthetists give this (1 grain) as a routine fifteen minutes before all administrations), the use of carbon dioxide when necessary and the adoption of the Trendelenburg position. Headache is now much less common than in the early days of "spinals" owing to the use of fine needles, which prevent leakage of cerebrospinal fluid. Should it occur, ephedrine is administered, together with abundant fluids per rectum or by mouth, and the usual remedies for headache, such as aspirin. A throbbing type of headache due to *increased* intracranial pressure may follow a "difficult puncture." This generally yields to a mag. sulph. enema (3 ounces in 6 ounces of water) and seldom requires intravenous saline. It must always be remembered that a fatal collapse may occur after the operation if any sudden change in position is made. Thus, if the Trendelenburg position has been adopted this must be maintained during the patient's transit back to bed and for three or four hours afterwards.

The need of protecting the patient from hot-water bottle burns is, of course, obvious.

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NERVOUS AND MENTAL POST-OPERATIVE COMPLICATIONS

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THE medical world of to-day is so familiar with the performance of surgical operations that the existence of any nervous or mental hazards directly connected with them is a possibility but seldom envisaged. This article attempts to set forth briefly certain post-operative nervous and mental complications which may be encountered in practice. Their incidence is fortunately rare, if there be included (as here) only conditions for which no cause can be found except the operation itself, the anæsthetic, or in cases of mental disturbance the pyschology of the individual patient.

NERVOUS COMPLICATIONS

The first group of complications to be considered are various forms of *pressure paralysis*. Perhaps the most important and the most striking of these is paralysis of the brachial plexus, although in this case the effects are produced by a stretching of the nerve trunks rather than by any direct pressure. This form of paralysis appears to occur most frequently after the operation for radical amputation of the breast, but has been observed also in cases of abdominal operations of different kinds. Three such cases have been personally observed, of which two followed amputation of the breast and one an operation for removal of the gall-bladder. There can be little doubt that the principal cause of this paralysis is the practice of fastening the patient's arms above the head on the operation table. In this manœuvre the arm tends to be abducted and displaced backwards at the shoulder-joint, a position which induces considerable strain, as may easily be discovered by any one who attempts to maintain it voluntarily for any length of time. Moreover, in the operation of amputation of the breast the division of the pectoral muscles allows the arm to fall back still more, thus increasing the stretching to which the brachial plexus is already subjected. A surgical colleague has suggested that a narrow operating table which affords little support to the shoulders may be a further factor in the production of this form of paralysis. The onset of paralysis follows the operation immediately ; it appears that it is often complete involving a total paralysis of the arm and hand but may be incomplete, in which event either the upper arm and shoulder are chiefly affected or the forearm and hand alone. The motor weakness seems as a rule to be more marked than any loss of sensation ; in one case of the writer's which exhibited a practically total flaccid paralysis of the arm and hand there was hardly any demonstrable loss of sensation at all. The prognosis of this form of paralysis is probably always good, but several months may be required before recovery is complete.

These cases have been very seldom reported in the literature. Through the kindness of the Librarian of the Royal Society of Medicine I am able to refer to two cases recently reported by Grilikhes in a Russian journal. In one a bilateral weakness of both arms followed an operation for appendicitis, in the other a paralysis of the right hand and forearm followed an operation for gall-stones. In both cases the operations were performed under general anæsthesia, in the first case both arms had been placed behind the head during the operation and in the second case the affected arm only had been so placed.

Surgeons therefore should be familiar with this admittedly rare but unfortunate result which may follow the practice of fastening the arms above the head on operating tables when the patient is under a general anæsthetic. More ordinary forms of pressure paralysis are sometimes found as immediate post-operative effects. Thus musculo-spiral nerve paralysis occurs occasionally from the upper arm being pressed against the edge of the operating table.

Sciatic paralysis or partial sciatic paralysis with involvement particularly of the external popliteal nerve with foot drop has been noted as occurring in women after labour, both instrumental and natural. Persistent sciatic pain has also been known to follow various types of operations when the patient has been placed in the lithotomy position under a general anæsthetic. More rarely paralysis of the ulnar nerve has been produced by pressure during anæsthesia. The prognosis of all these forms of nerve paralysis appears to be good, although in many cases recovery may be slow.

Space forbids discussion of all the more remote but possible nervous complications but mention may be made of the occasional occurrence of *hemiplegia.* Hemiplegia due, presumably, to a vascular lesion of the brain has been personally observed as an unexpected and tragic post-operative event in patients operated on for a number of different conditions unconnected with symptoms of pre-existing cerebral disease. It is most often seen in elderly patients the subjects of cardiovascular disease ; arteriosclerosis with or without high blood-pressure is generally present ; perhaps the senile patient with the decrescent form of arterial disease and without a marked degree of high tension is the most likely subject for this complication. Cerebral thrombosis is the lesion responsible for the hemiplegia in most cases of this type. In some patients, however, the abruptness of the onset and the severity of the hemiplegia suggest cerebral embolism.

Two illustrative cases may be mentioned. One was that of an elderly man suffering from early gangrene of the toes of the left foot. Amputation of the leg was followed by a right hemiplegia and aphasia. In this case there was probably a thrombosis resulting from stagnation of the cerebral circulation associated with the shock of the operation.

A woman had a hysterectomy performed for fibroids. On leaving the nursing home three weeks later she suddenly became unconscious and on recovery was found to have a complete right hemiplegia and aphasia. This patient did not show any signs of cardiovascular disease; the Wassermann reaction was negative. The extremely sudden onset as well as the severity of the hemiplegia suggested embolism of the middle cerebral artery. The exact cause of such a hemiplegia is obscure, but it may well have been an example of " paradoxical embolism " ; in this case an embolus from the site of the pelvic operation reaching the brain via a patent foramen ovale.

ANÆSTHETICS AND NERVOUS COMPLICATIONS

Certain nervous complications resulting from anæsthetics must now be considered, and in this connection spinal anæsthesia deserves the first mention. It must, however, be clearly understood that any nervous complications more serious than headaches are exceptional. Koster and Weintrob have classified these complications as follows :—

(*a*) Immediate, consisting of paralysis of the phrenic nerves and respiratory paralysis ; these are exceedingly rare.

(*b*) Remote, which may consist of : (1) meningitis ; (2) paresis and anæsthesia ; (3) headache ; (4) mental changes ; (5) backache ; (6) late results.

Ashworth from a personal experience of 650 cases reports only three showing any marked form of paralysis. Of these one patient had a paresis of the sixth nerve and a second a paresis of the legs ; in both complete recovery followed. A third patient suffered from complete paraplegia and died twenty-five hours after operation. Ashworth emphasizes that headache is the most common complication and finds its incidence to have been 4·9 per cent. in a series of 184 cases in which percaine was the anæsthetic used. Peluse states that headache after spinal puncture may be expected in less than 3 per cent. of cases. He distinguishes two types (1) the most common due to seepage of cerebrospinal fluid and a diminished fluid pressure, and (2) a less common type due to a benign meningitis often showing a pleocytosis of the cerebrospinal fluid and responding to a second puncture.

In the *treatment* of post-spinal anæsthetic headache the following procedures are recommended. The patient must lie flat on his back with the head low ; the foot of the bed may be raised on blocks. He should be encouraged to take plenty of fluid. Any of the usual analgesic remedies may be given, such as aspirin, phenacetin, antipyrin or proprietary preparations, such as veganin or veramon. An intramuscular injection of pituitrin 1 c.cm. is often useful and ephedrine may be given by the mouth in a dose of $\frac{1}{2}$ to $\frac{3}{4}$ of a grain. In cases which do not respond to this line of treatment, Koster and Weintrob recommend enemas of 3 to 6 ounces of a 50 per cent. solution of magnesium sulphate or an intravenous injection of 70 c.cm. of a 15 per cent. solution of sodium chloride and finally repeated lumbar puncture with drainage of the cerebrospinal fluid. Clearly the latter procedures are based on the hypothesis of an increase in the cerebrospinal fluid pressure due to an aseptic meningeal reaction.

Langton Hewer reports an interesting case of persistent paralysis of one leg with sensory loss after 15 c.cm. of 1 in 1,500 solution of percaine had been injected in the space between the first and second lumbar vertebræ. Nine months later a laminectomy was carried out and a sheath of fibrous tissue was found constricting the lower part of the spinal cord and the roots of the cauda equina.

Brock, Bell, and Davison in a study of nervous complications following spinal anæsthesia remark on the occurrence of isolated cranial nerve lesions ; of these paralysis of the sixth nerve is the most common but affections of the third, seventh, eighth and twelfth nerves have all been reported.

These authors report in detail seven cases in their own experience, of which the following is a brief summary : (1) a benign type of lymphocytic meningitis with high fever ; (2) a meningitis with polynuclear leucocytosis of the spinal fluid, possibly due to infection ; (3) a case resembling polioencephalitis ; (4) radiculitis with severe root pain ; (5) severe cauda equina paralysis ; (6) paralysis of the cauda equina combined with signs indicating involvement of the spinal cord ; (7) a fatal case in which a post-mortem examination of the nervous system was obtained. Paraplegia had appeared three days after the spinal anæsthetic and death occurred three months later. The morbid picture was one of a transverse myelitis at the level of the twelfth dorsal segment, with extensive destruction of the myelin sheaths, axis cylinders and glia, the changes being especially marked at the periphery of the cord and in the root entry zones.

Such neurological complications as those described are practically unknown after the use of the ordinary volatile general anæsthetics.

Hammes and Frary, however, have recorded a remarkable instance of three members of one family in all of whom polyneuritis appeared after the administration of ether for laparotomy. In each case the symptoms appeared within two weeks of the etherization and were characterized by an acute onset and rapid spread of a motor paralysis. One patient died and pathological examination showed extensive demyelination of the peripheral nerves with some overgrowth of the connective tissue.

The recent widespread use of the so-called basal narcotics does not appear to have been attended by serious risks of nervous complications, if depression of the respiratory centre during the actual administration of the drugs is excepted. Palmer, however, has recorded a very interesting case of polyneuritis after the use of evipan.

The patient was a woman of 48 admitted to a mental hospital for melancholia. On account of menorrhagia with some uterine enlargement a diagnostic curettage was performed on June 27. The operation was performed under evipan anæsthesia. Three days later paresis of the right external rectus muscle, weakness of the left side of the face, and paresis of the left side of the palate were noticed. By July 2 the signs were more marked and a bilateral external rectus palsy was present. Recovery did not take place until the end of October and even then diplopia was still present.

Landau and Woolley have reported the case of a young man of twenty-three in whom a sebaceous cyst of the scrotum was removed under anæsthesia induced with 10 c.cm. of evipan solution, supplemented by gas and oxygen. The patient was very restless after the operation and needed morphine. On the evening of the third day after operation he complained of headache, giddiness and photophobia and his pulse dropped to 40 per minute. On the fourth day he was drowsy with a pulse of only 36 and showed nystagmus when the eyes were directed to the left. The cerebrospinal fluid was normal and after the lumbar puncture the nystagmus disappeared. On the sixth day he was still drowsy, complained of occipital headache and vomiting. Hypertonic glucose solution was given intravenously. On the eighth day his symptoms began to disappear and he rapidly made a complete recovery.

MENTAL COMPLICATIONS

Mental disturbances of any severity after surgical operations are fortunately uncommon. This article is not concerned with cases of mental disorder which may ensue from the very nature of the operation itself. Such cases are rare, but examples will be found in the acute mania which occasionally supervenes after operation in cases of toxic goitre or Graves's disease or the opposite condition of myxœdema accompanied by mental changes in cases of total thyroidectomy. In the latter cases the type of mental disorder tends towards apathy and depression sometimes with the gradual development of dementia.

The general problem of insanity after surgical operation has been strangely neglected in British medical literature. Clinton Dent, however, in 1889 contributed a valuable paper on this subject on which he also wrote in Allbutt and Rolleston's System of Medicine. His general conclusions probably remain as true as when they were written, and may be summarized very briefly as follows : Insanity may be a direct sequel of surgical operation. The nature of the operation has in all probability little to do with the occurrence of the mental disorder. Sepsis is probably not a causal factor. The form of the mental disorder is generally a maniac type. The prognosis in the great majority of cases is good.

Owing to the paucity of the literature on this subject it is difficult to find what is the true incidence of this particular post-operative complication. Kelly found forty cases of mental disorder in a consecutive series of sixteen hundred operations, but few observers can have encountered such a high incidence as this. Mauclaire had experience of only ten cases in thirty years.

It is natural that the exact cause of the mental disorder should have been a matter of dispute. The nature of the operation, the question of sepsis, and the antecedent factors of hereditary and predisposition have been the principal points for discussion. Mauclaire states that the majority of cases have followed gynæcological operations or operations on the male genital tracts. Most observers, however, and particularly Clinton Dent, have been unable to find any direct relation between the kind of operation and the occurrence of mental changes. It can hardly be maintained that sepsis is the essential or, indeed, in most cases even a contributary cause, since in many cases no evidence of septic infection has been forthcoming.

By most authors a hereditary predisposition is held to be the most important etiological factor. Da Costa stated that in all cases there is a predisposition hereditary or acquired and adds that it (post-operative insanity) is practically identical in nature and mode of genesis with puerperal insanity. Muncie stresses two factors : (1) the pre-existence of mental disorder ; (2) certain operative factors, sepsis, fever, dehydration, anæmia and cachexia. If the condition be compared with puerperal insanity—and it certainly seems fair to do so—the possibility of sepsis being a genuine causal factor in some cases can hardly be excluded. For it is generally agreed that the incidence of puerperal insanity is higher in cases attended by infection. Davidson has recently reported an outbreak of puerperal infection in the Rotunda Hospital, in which out of fourteen cases three developed insanity.

General anæsthetics (ether and chloroform) have at times been invoked as the exciting cause. The fact, however, that the symptoms of mental disorder do not as a rule appear until after the lapse of several days is a point much against this suggestion. It is, however, certain that in rare instances spinal anæsthesia has been directly followed by mental disorders. Dickson Wright, for example, saw two cases of acute mania after the intraspinal injection of 8 c.cm. of a 1 in 1,000 solution of percaine.

Both sexes are equally affected by post-operative mental disorder and no special period of life is particularly prone to be attacked. Children may suffer as well as adults ; Dent stated that he had seen well-marked examples in children of six, eight and eleven years of age.

The actual onset of the mental symptoms is at a variable time after the operation. Occasionally they appear as early as the second day, generally within two or three weeks at the most ; in Dent's experience the longest interval was eight weeks. Makékarie recorded three cases in which the symptoms appeared between the second and fourth days after operations under chloroform anæsthesia. In Muncie's four cases the onset was on the sixth, seventh, tenth and thirteenth days respectively. Karlan reported a case of the sudden onset of mental confusion with a suicidal attempt in a man of twenty-three on the fourteenth post-operative day. Washburne and Carns stated that from the second to the fourth day is the most common time at which symptoms are manifested.

Interest has naturally attached to the kind of symptoms exhibited in this form of mental disease. It must be emphasized that the type of mental change or reaction exhibited by these patients is in no way specific. Exactly similar forms of mental disorder are found in patients suffering from such varying conditions as puerperal insanity, delirious states induced by drugs, including alcohol, in cases of head injuries and in patients in whom the mental symptoms appear without any clear organic basis.

The non-specific character of the mental symptoms in many states of delirium has been well brought out in a valuable paper by Wolff and Curran. In the majority of cases there is found a manic type of reaction attended by psychomotor excitement and delirium frequently with marked hallucinations and delusions. In this stage a moderate pyrexia is not uncommon. In some cases a phase of depression may follow before there is a gradual return to the normal. Although not very common the risk of suicide is by no means negligible and homicidal attempts have also been recorded.

In general terms the *prognosis* may be regarded as good, although such a statement is naturally subject to certain modifications. The general physical state of the patient and the presence or absence of any hereditary predisposition to insanity are the two most important factors to be considered. Thus in a young and healthy subject the prognosis is more favourable than in the aged or in those the subjects of gross arterial, cardiac or renal disease ; chronic alcoholism is a very unfavourable feature. A bad family history or a record of previous mental disorder in the patient will naturally increase very considerably the gravity of the outlook.

The course to recovery may be rapid, especially in the young, but in old and debilitated patients may be slow and tedious. There is generally a complete amnesia for the period of time during which the acute symptoms were present. Exceptionally the expected recovery fails to materialize and the patient sinks into a state of chronic dementia.

The *treatment* of these patients should be conducted upon the same principles as those applying to the same forms of mental disorder occurring in other conditions. It may, however, be mentioned that when it is found impossible to continue nursing these cases in an ordinary hospital or nursing home advantage may be taken of the provisions of the Mental Treatment Act of 1930, whereby such cases may be transferred to mental institutions as temporary patients without the legal process of certification. Under this Act the patient must be for the time being incapable of expressing himself as willing or unwilling to receive treatment. Many of these patients will be in this condition and are therefore suitable cases to be dealt with in this manner.

The essentials of treatment are to maintain the nutrition by adequate feeding and to secure rest and sleep. If food be consistently refused recourse must be had to feeding by a nasal or stomach tube. In excited and restless patients sedatives will generally be needed by day as well as hypnotics to procure sleep. As sedatives the following may be tried, the bromides 10 to 30 grains t.i.d., chloral hydrate 5 to 10 grains t.i.d., or small doses of one of the barbiturates such as medinal 3 grains or luminal 1 grain t.i.d. Sometimes hyoscine may be the only effective remedy; 1/100 grain of hyoscine hydrobromide with $\frac{1}{6}$ or $\frac{1}{4}$ grain of morphine may be injected subcutaneously; sometimes as much as 1/50 grain of hyoscine may be needed, as hypnotics the following may be recommended: chloral hydrate 10 to 20 grains, chloralamide 30 grains best given with a little alcohol, sulphonal 20 to 30 grains, luminal 1 to 2 grains, medinal 7 to 10 grains, or veronal 5 grains. Not more than 100 grains of sulphonal should be given in any one week. Nembutal 1½ to 3 grains is another drug of value in restless and excited patients, and the hypodermic injection of sodium luminal ½ to 2 grains may also be recommended. In truly maniacal cases prolonged narcosis with somnifaine may be attempted if the patient is under constant supervision in an institution; 2 c.cm. of somnifaine are injected intramuscularly, from 5 to 8 c.cm. being needed in the twenty-four hours. This treatment, however, is not devoid of risks which appear to be lessened by the simultaneous administration of insulin and glucose (Parfitt).

Finally the benefits of treating the excited patient by prolonged immersion in a hot bath should not be overlooked if this method of treatment be available.

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PHYSIOTHERAPY IN POST-OPERATIVE CONVALESCENCE

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In this country for many years past it has been the custom to invoke the aid of physiotherapy during convalescence in most cases in which surgical treatment has been required for the extremities. In the management of convalescence of all injured extremities there should be two thoughts uppermost: to render recovery of function possible, and to restore function to perfection as speedily as possible. Sometimes the part played by physiotherapy is relatively small, sometimes big: it may be needed as soon after direct surgical intervention has taken place as is possible, or it may be necessary to postpone the application of it.

As far as the application of early treatment is concerned opinions differ, and it is easy for the physiotherapist to understand why this should be. The main reason is that comparatively few surgeons are able to appreciate the delicacy with which physical treatment can be administered efficaciously. Even in the case of a septic wound of a knee-joint, when once efficient drainage has been established, an immediate start towards restoration of function may be made by one who is accustomed to dealing with acute cases. There is only one law which must never be broken in acute cases of any description, namely, that the treatment must be devoid of all pain, either at the time of administration or subsequently. This involves familiarity with passive movement as understood by the physiotherapist, and this unfortunately does not correspond with the "passive movement" of the surgeon. Not only must the movement be painless, it must not meet with any assistance from the patient's muscles, as it then becomes an assisted movement; and it must not encounter any resistance from the patient's muscles, as it would then degenerate into a resisted or forced movement. Hence the whole part—the whole of the patient in fact—must be in a state of complete voluntary relaxation. At this stage, if movement is to be performed, all other physical treatment aims at securing relaxation and, as a rule, little else. Needless to say the range of movement need not be great. Support must be perfect throughout, and the return to the rest position must be performed as carefully as the journey from it. There is no need to repeat the movement, and it should only aim at retaining a range that has not been lost. The restoration of lost movement is the part of assisted, resisted, or forced movement. Then there are certain cases in which early movement is impossible, an extreme case being that of a patient whose limb is encased in plaster of Paris. If necessary holes can be cut in the casing over the motor points, and the muscles can be stimulated with faradism—not, of course, to exercise them, but merely to cause them to move, so that adhesions cannot form in a tendon sheath or in the substance of the muscle should this have suffered direct injury.

With these two great prophylactic agencies available, one great bugbear of after-treatment, the formation of adhesions, can be reduced to a minimum. In some cases, e.g. septic wounds of the palm or after suture of tendons, the date of recovery of function can frequently be foretold by one circumstance only, namely, the date at which physical treatment began. A similar prognosis can often be made after certain operations, after fracture of the olecranon or of the patella, for example, and even after operation for the removal of a torn semilunar cartilage. On the other hand, there are cases in which physical treatment must inevitably be postponed, for instance, after operation for bone grafting, or suture, say, of the quadriceps, or tendon Achillis; it is impossible to do other than wait until the scar tissue is firm. True, if the patient were confined to bed, it would be reasonable and practical to start the treatment at a relatively early date ; but, in the end, the final restoration of function would not be hastened to an extent that would justify the prolonged and enforced recumbency.

After many operations the patient has, of necessity, to learn once more the art by which the proper functioning of any part can take place. After nerve suture, for example, the utmost care is needed to ensure that a proper balance is kept between the weakened muscles and those that have not been affected. This is mainly a question of splintage, but it should be arranged to inhibit those movements only that might do harm, while allowing those that are helpful to recovery. Muscle training is a special art, and quite apart from electrical and other methods of treatment. So, too, after prolonged fixation, not only has muscle strength degenerated, but the muscle, tendon, and joint senses will have deteriorated. One or other, indeed, may have been outraged by accident or operation, let alone by the fixation. It is here that physical treatment can help so much by re-education, and particularly in the re-education of walking. It must not be forgotten in this connection that restoration of movement has, as a chief impediment, the action of gravity. Immersion in water reduces this, and so it comes about that Droitwich, with the brine swimming bath, is often visited by those anxious to regain muscular strength seriously reduced, or mobility, or both.

MANIPULATION

More and more the use of joint manipulation is finding a sure place in physical treatment. Roughly, patients for whom this treatment may be required, can be divided into two main groups, namely, those whose recovery depends on the breaking down of definite adhesions, and those who merely require that some lost function within the joint should be restored. When adhesions are broken down, the objective in view is to remove an impediment to function and then to maintain movement so that function may not again be lost. With this end in view physical treatment may be as essential as is the knife to the surgeon or the drug to the physician. Pain on movement is the one great inhibition to voluntary movement ; and so, if the operation is to be successful, painless movement must be restored. The very fact, however, that adhesions have been broken down means that the joint or the surrounding structures, or both, have been damaged. Therefore there will be pain on movement, and, often enough, the whole of the agencies at the disposal of the physiotherapist may be required to maintain the range of movement that has been restored. Even if reaction is slight, few laymen realize the anatomical limits of the normal range of movement, and, if left to themselves to carry out their own treatment, the chances are that the full range of physiological movement will not be attained. Complete restoration is thereby rendered unlikely, and even impossible. At every joint it is possible to perform for a patient at least one movement which he cannot possibly perform for himself with his own muscles. For example, the most valuable of all manipulative measures is the application of tension. But, if full restoration of those movements that are not under voluntary control is lacking, it is incredible that those that are so should be restored.

Passing to the manipulation of joints in which function is not perfect, yet in which no definite adhesions are present, it may well be that little in the way of after-treatment is required. Even so, to ensure against relapse it is always wise to see that the patient knows the full range of voluntary movement and how to secure it. For instance, it is quite a common thing for patients to show off with pride the movements that they perform religiously in the cervical spine each day in the upright position, while in complete ignorance of the fact that it is impossible to perform the full range of movement except when recumbent. So, too, if the deltoid is weak or the shoulder-joint painful, it may be quite impossible to perform the full range of movement in the upright position, though comparatively easy when recumbent. Also rest from movement and rest from function are as the poles apart, particularly where weight-bearing function is concerned. Movement in a lower extremity may be prescribed with freedom, provided no weight is placed upon the limb, while a mere fraction of the same movement would risk utter disaster were the body-weight supported.

BREATHING EXERCISES

With regard to operations on the respiratory tract, it is common knowledge that removal of tonsils, or of adenoids, or of both is merely the first stage in treatment. No operation of this type will teach the child to breathe properly or to adopt a better posture. The operation renders cure in these two directions possible, but it rarely follows unless the patient is taught how to gain the benefits the operation can, and should, bestow. The early treatment by physical means of cases of empyema has done much to rob the operation of the fear of subsequent deformity, which was so very real not long ago. Even if all that physical treatment could accomplish consisted of teaching children, and adults, too, for that matter, to blow their noses properly, it should earn acknowledgement as a most valuable prophylactic treatment. To obstruct the free passage of air by compressing the anterior nares with a handkerchief, while increasing the intranasal air-pressure, is surely the best way of forcing infected material into air-spaces which promptly become infected. It would be interesting to know what percentage of cases of antrum, sinus and mastoid trouble are due to the abuse, rather than the use, of the handkerchief; unfortunately statistics are not available.

PREVENTION OF BACK STRAIN

It is a matter for regret that surgeons as a whole, while realizing the importance of posture, do not give it the same amount of thought during anæsthesia and the subsequent period of recumbency. Many a patient owes prolonged and inveterate backache to the fact that the lumbar spine has not been supported during an abdominal operation. Should any surgeon be doubtful, let him lie flat upon the floor without moving for a short space of time. He will soon become conscious that unless he moves, he will inevitably suffer from the symptoms commonly attributed to lumbago. And let him remember also that this is, in spite of the fact that his muscles, in consciousness, can help to stave off the attack to a very large extent. Take away this guard and disaster often follows. This particularly applies if the patient originally had a marked lordosis. The over-flattening of a spinal curve will often cause a disorder of function in the joints which manipulative treatment alone can rectify.

The obstetrician also bears a large amount of responsibility for the production of backache. During delivery an enormous strain is usually placed upon both sacro-iliac joints —the ligaments are stretched and strained. Now the binder, which is applied subsequently, should support these joints ; just as strapping is used to support and limit the movement of a sprained ankle. To accomplish this a firm band must be placed horizontally round the pelvis just below the two anterior superior spines of the ilia. Few binders are so applied as to include this support. Then, long before the ligaments have recovered, the patient is allowed to sit up in the long-sitting position, with the legs stretched out and the knees straight, the one position of all others that lays the greatest possible degree of backward torsion strain on the already injured joints. Small wonder, then, that so many women after childbirth suffer from backache until adequate support is provided.

CARE OF ABDOMINAL MUSCLES

The story of the obstetrician, the gynæcologist and the abdominal surgeon does not end here—rather is this merely the beginning. After child-birth, or the removal of any substantial growth from the pelvis or abdomen, the muscles of the abdominal wall have been stretched for a considerable time, and a stretched muscle is not only a weak muscle but it is also inefficient. Hence it follows that unless steps are taken to restore the tone, strength and function of the muscles of the abdominal wall, it is incredible that they should function efficiently; still more is it unlikely, if a period of absolute rest is enforced after vigorous and severe strain, or after trauma with knife or retractors. The muscles of the abdominal wall are endowed with a very important function in respect of posture, and, indeed, they should be regarded as a definite part of the controlling musculature of the movements of the spinal column and the relationship of the column to the pelvis. So again, it is small wonder if lack of attention to the hygiene of the abdominal wall should tend to disaster in the form of disordered function of the joints of the spinal column and pelvis. Even if no considerable mass is removed from the abdomen, some trauma of the muscular wall is inseparable from any abdominal operation. It is true that often enough spontaneous recovery will take place, but the reverse is often the case, and then the inevitable pain and disability will follow.

Another point that is sadly overlooked is the importance of the proper movement of the muscles of the abdominal wall to the portal circulation. The veins within the abdomen and pelvis having no valves, there is nothing to drive on the broad stream of blood, and a heavy one at that, towards the heart while in the upright position. If therefore the muscles of the abdominal wall fail to function efficiently, there is nothing to prevent the venous system within the abdomen from becoming a stagnant reservoir. The pressure then dilates the veins, the capacity of the reservoir increases, stagnation becomes more and more marked, and the patient is well described as " bleeding into the portal area." Then follows the well-known train of symptoms, indefinite, perhaps, but so very real, of general tiredness and malaise, of headache and backache, of overwhelming incapacity and, often enough, of symptoms associated with perverted somatic stimuli.

It should therefore be the first duty of obstetrician, gynæcologist, and abdominal surgeon alike to see that every patient regains full and efficient control of the abdominal musculature before being discharged as cured. The earlier he starts to secure it the shorter and easier will be the task, and here let it be emphasized once more that massage alone has never yet built up muscular strength. It may render the function of muscle to contract a possibility, it can encourage it to contract, it can assist it to recover from the results of contraction, but it is the contraction and relaxation, and these alone, that can restore function. Here therefore is the widest possible scope for the employment of physical therapy.

LEGS AND FEET

After any prolonged illness, and particularly if sepsis has been present, there is inevitable a marked loss of muscle tone, of joint, tendon, and muscle sense, and often enough actual stiffness in the joints particularly of the back and the feet. Just as movement is essential to the maintenance and restoration of muscle power, so, too, is movement essential to the maintenance of elasticity. If this be diminished, the normal physiological movement of the body must be impaired. For example, if there is any loss of elasticity in the ilio-tibial band, the movements of the pelvis become impaired and a whole train of disability is established, not the least prominent symptoms being low backache and pain radiating down the leg. As a prophylactic therefore massage, to restore movement and elasticity in the lower extremity, is often of vital importance to the subsequent happiness and well-being of the individual. I have not seen a case of thrombosis in a lower extremity after confinement or operation on which massage treatment for the two limbs has been prescribed at an early date. Coincidence or not, massage is at least a rational prescription whenever the patient, through weakness or other necessity, remains for any length of time with the lower limbs immobile.

Finally, a plea may be entered for the hygiene of the feet of any patient who has been confined to bed for any cause for a considerable time. Not only does the actual power of the intrinsic muscles of the feet degenerate as the result of the lack of function, but often enough the joints become stiff and painful. If the body-weight is placed upon feet in this condition, the advent of metatarsalgia is only what we might reasonably expect. For those who have never had it, it is impossible to realize the ghastly condition of a life in which every step spells pain. Not only is all activity curtailed, but temper is short and irritability is rife. Yet the simplest of manipulation and the teaching of a few exercises, to be performed before leaving bed for the first time, would save untold hours of misery from this cause alone.

BED-SORES AND THEIR TREATMENT

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BED-SORES, or decubitus ulcers, occur in two or more less distinct forms—the acute or trophic, and the chronic or postural.

The acute or trophic ulcer is the less common of the two, and is associated with injury to, or disease of, the nervous system. The onset is rapid and the ulcer quickly extends both superficially and deeply.

In a case under my care an acute ulcer developed in connection with sudden paraplegia following a carcinoma in the breast with a secondary deposit in the spine. In spite of assiduous and skilled nursing the sacrum was exposed eight days after involvement of the spinal cord.

Acute or trophic ulcers commonly fail to respond to any form of treatment, but the causative lesion is usually of such a nature that, in any case, the hope of recovery is slight or negligible.

A postural or chronic ulcer is commonly considered to be a reflection on the attention and care bestowed on the patient by the medical attendants and nursing staff, and in some cases this criticism is justified, although circumstances may render adequate nursing and attention difficult.

CAUSES

There are four factors which encourage the formation and development of a decubitus ulcer ; these are pressure, trauma, malnutrition and maceration of the skin.

Pressure.—Decubitus ulcers almost always occur over bony prominences, notably the sacrum, coccyx, scapulæ, elbows, heels, and, if the patient spends much time on his side, the great trochanters. The vitality of the skin in relation to pressure has been investigated experimentally in Australia by Trumble.[1] He found that pressure of more than one and a half pounds to the square inch over a prolonged period caused necrosis of previously healthy skin. He also stated that the surface area of a man 5 feet 8 inches in height, and 150 lb.

in weight, is approximately 2,790 square inches. Assuming that, in the recumbent position, one-fifth of this surface is available for weight bearing, then the pressure, if evenly distributed, would be less than one-third of the pound to the square inch. Such a moderate pressure would actually assist nutrition, but in practice the weight is chiefly borne by localized areas overlying bone, the combined surface of which is inadequate. The practical application of these facts is to emphasize that every effort must be made to utilize as large an area as possible for weight-bearing, and that special attention must be given to skin and integument which cover bony prominences. Frequent change of posture is the obvious method of redistributing pressure. A healthy person normally changes his posture at frequent intervals, especially if lying on a hard surface, and the nurse should arrange that a helpless patient lies on alternate sides for an hour or so daily, at the same time keeping a watchful eye on the skin over the great trochanters. Redistribution of pressure is most readily obtained by the use of a water-bed. Boards should be placed beneath the mattress so as to support the water-bed which is half-filled with water at a temperature of 100° F. The water-bed is covered with a blanket, mackintosh and sheet, with a draw mackintosh and draw-sheet under the buttocks. Air cushions are valuable in some cases, especially for protection of the heels. In this connection much comfort will be derived from a pillow under the knees (commonly known as a " donkey "), which allows some pressure to be borne by the back of the thighs, and calves, and the flexion of the knees allows pressure to be borne by the under-surface of the heels rather than by the more susceptible posterior portion. Cotton-wool " nests," or rings cut from a sheet of sorbo rubber form useful protections for the bony prominences of the back and trochanters. In order to increase the area available for pressure-bearing, the normal curve of the spine in the lumbar region should be utilized. An air cushion or soft pillow should be inserted beneath the hollow of the back, so that the skin in this region shares in the burden of pressure-bearing. A common complaint during convalescence after a prolonged illness is weakness and aching in the back. This is due to the muscles and ligaments having been allowed to stretch, owing to sagging of the lumbar curve, and the support mentioned above will do much to prevent this tiresome condition.

Trauma.—Injury to the skin, unless already present, is always preventable. Common causes, which should be avoided, include wrinkling of the draw sheet, which must be kept taut, or mal-adjustment of such supports as rings or pads, which are utilized to distribute pressure. An abrasion due to an overlain biscuit crumb is a traditional cause of a bed-sore. Harsh linen, due to over-zealous laundrying, is a definite contributory cause of bed-sores, and in some cases linen is impregnated with chemicals which act as irritants to a susceptible skin. Those who are in charge of the patient should assure themselves that sheets are soft, pliable and non-irritating. Small pieces of grit in the dusting powder are apt to cause abrasions of the skin. If the nurse rubs the powder into the skin at all vigorously minute excoriations are likely to occur, and if other factors are favourable a sore may result. Therefore only powders which are carefully refined and of good quality should be used. Protection of any specially vulnerable areas by means of elastoplast is of great value. The plaster must not be stretched before application, and is applied where bed-sores may be expected.

Malnutrition of the skin.—Constant attention by the nursing staff is necessary to maintain the nutrition of the skin at the highest possible level. Once a day, or more often if the condition of the patient permits, the nurse or nurses should roll the patient on to his side and attend to the back, which is sponged, dried, rubbed with astringent and finally powdered. After the washing the skin is dried gently with a soft towel, and massage is applied in the form of gentle kneading and effleurage. A stimulating and astringent preparation is then rubbed into the skin. Most nursing schools use their own favourite preparation, and among those commonly used may be mentioned brandy (less in evidence now than in pre-war days), eau-de-Cologne, and varying strengths of alcohol, usually in the form of surgical spirit. It must be mentioned that methylated spirit is definitely harmful, as it contains substances which are liable to irritate the skin. After the final rubbing the skin is dusted with some powder, such as dermatol (bismuth subgallate), talcum powder, or equal parts of boric acid, zinc oxide and starch, carefully prepared so as to exclude grit. If the patient is incontinent, the treatment outlined above may be required several times a day.

Maceration.—Maceration of the skin is liable to result from sweat, urine, fæces or pus. Sodden skin is particularly vulnerable, and every effort must be made to keep the skin as dry as possible. In the case of spinal injuries incontinence of urine in the male is dealt with by keeping a urinal in position, while in the female, or in cases associated with discharging wounds, absorbent material and mackintoshes can be arranged so as to protect the adjacent skin. Fortunately most cases of paraplegia are constipated, and the bowels can be moved as necessary by means of an enema. If the patient is restless the absorbent pad can be kept in place by a triangular piece of muslin, applied in the same manner as a child's diaper.

TREATMENT

General treatment is important, as the recuperative powers of the skin, as well as other tissues, depend to some extent on the nutrition and well-being of the patient. Fresh air, bright surroundings, adequate nourishment and suitable medicines are all important. Some practitioners are of the opinion that iron is particularly useful, and H. A. Hare[2] recommended that tincture or the chloride should be given in full doses, i.e. 20 minims every four hours. Insulin is also worthy of consideration, even in non-diabetic patients, and it is remarkable how in some indolent sores healing commences and continues two or three days after the initial injection.[3] An adequate dose is ten units a day, which can be given in one injection, or divided into two five-unit doses. This method of treatment does not seem to be widely recognized and is always worth a trial when local measures are meeting with little success.

Local treatment.—Bed-sores occur in one of three more or less distinct stages—threatened bed-sore, inevitable bed-sore, and actual ulcer. The last stage varies from superficial ulceration to extensive destruction of skin, fasciæ, muscles, ligaments and even bone. It is a remarkable fact that even when an ulcer has reached ghastly dimensions the patient is often quite unaware of the extensive destruction of his tissues.

Stage I. Threatened bed-sore.—Erythema of the skin, which disappears on pressure, is the earliest indication that a bed-sore is impending. At this stage moist dressings or ointments are contra-indicated, and reliance is placed on the prophylactic measures already outlined, combined with some preparation which will harden the skin if it is unduly soft. For this purpose the application of 5 per cent. silver nitrate in distilled water is useful, or, alternatively, the following preparation[4] :—

Alum - - - - - -	30 grains
Water - - - - - -	250 c.cm.
Alcohol - - - - - -	250 c.cm.

to be applied several times a day.

Another preparation which is recommended at this early stage is equal parts of tincture of catechu and liquor plumbi subacetatis.[5]

If the skin is harsh or dry, as over the heels or elbows, then some protective covering may prevent the development of a threatened bed-sore. For this purpose elastoplast is excellent, provided that it is not stretched before application and that it is applied smoothly. If small areas are affected several layers of flexible collodion painted over the surface may prevent the dry skin from cracking.

Stage II. Inevitable bed-sore.—Ulceration is imminent when redness and congestion appear and are unaffected by pressure. Treatment now resolves itself into minimizing the amount of destruction of tissues, and general principles of treatment must be utilized to the full. In most cases the best form of local treatment is the tannic acid spray utilized as for burns. A freshly-prepared 5 per cent. solution in distilled water is sprayed on at hourly intervals, and the affected surface is dried by means of an electric hair-drier or by exposure to dry heat from electric lights suspended from a cradle. A tough and adherent coagulum forms after about twenty applications. Healing usually takes place in an uninterrupted and satisfactory manner, as in the case of burns, but occasionally pus collects under the coagulum. If this complication occurs the coagulum is either partly snipped away, or removed entirely after softening by the application of gauze soaked in liquid paraffin. In uncomplicated cases the coagulum remains until healing is well advanced, when it is trimmed until the final portion detaches itself.

Stage III. Ulceration.—This final stage of bed-sores presents an anxious and constant problem to those who are responsible for the patient's welfare. Anxious, because bed-sores are apt to spread in an alarming manner, and toxic absorption adds to the other burdens which the patient has to bear, and constant because treatment may require almost daily variation according to the progress of the ulcer. As a general principle, when actual ulceration is present, ointment and other greasy or oily preparations are unsuitable.

In early cases of bed-sores treatment by elastoplast is always worth while. Canty[6] has reported a series of cases in which he obtained very satisfactory results. Two pieces of elastoplast are applied, so as to cover the ulcer and the surrounding skin. If the sore is of greater diameter than the width of the bandage two pieces are applied side by side, and held together by other pieces placed at right angles. It is important that the elastoplast should not be stretched before it is applied, and it is left in position until it is loosened by the discharge, which may be at any time from one to several days. The loose plaster is removed, the ulcer is cleansed with sterile gauze, and the plaster then reapplied. This process is repeated as often as necessary. The virtues of this method of treatment are that granulations are unimpaired by frequent dressings, and possibly the retained discharge possesses a proteolytic power which liquefies dead tissue. Thus the elastoplast treatment of bed-sores resembles Winnett Orr's method in dealing with acute osteomyelitis. A further advantage of the plaster treatment is its simplicity, and that no very skilled nursing is needed.

Occasionally these protective measures fail, especially in acute cases of bed-sores associated with a spinal lesion. Extending bed-sores, when protection by plaster has failed, are the only variety which call for the use of moist applications. Various antiseptics are suitable, such as flavine, eusol, or dettol. If surrounding tissues are inflamed an occasional boric fomentation is advisable, but care must be taken to avoid maceration of the skin. It is wise to change antiseptics every few days, especially if local improvement is disappointing. As in the case of any infected wound, organisms appear to become immune to any one antiseptic after prolonged use.

When the stage of healing is reached, and discharge becomes serous, the application of 10 per cent. ichthyol in glycerin usually expedites healing in a very satisfactory manner, in fact, this preparation gives good results with most varieties of infected wounds after the acute inflammation has subsided. At a later stage more stimulating dressings are indicated, so as to encourage growth of epithelium, and red lotion, or equal parts of zinc oxide and resin ointment should be applied. The question as to the advisability of skin grafting is decided on general principles.

PLASTER SORES

In connection with sores due to pressure a word may be added concerning plaster sores, especially as skin-tight plaster of Paris is now so commonly used in the treatment of fractures. Prominent bony processes, especially the tubercle of the tibia and the malleoli, usually require protection, and the position of the limb should not be altered after the plaster has been applied, otherwise rucking is apt to occur and the resultant ridges predispose to pressure sores. Plaster sores often cause surprisingly little pain, and the patient may only complain of discomfort during the first twenty-four hours or so. Should a pressure sore develop palpation of the plaster will reveal a local rise of temperature. If pus collects beneath the plaster a discerning nose often detects a musty odour, and if these warnings are overlooked, eventually pus will escape beneath the plaster. When the condition is self-evident it necessitates removal of the plaster, and treatment of the sore according to the principles already enumerated.

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CATHETERS, AND THE AVOIDANCE OF SEPSIS

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In this article an attempt will be made to confine the subject of catheterization within the limits of simplicity, and to deal only with the common problems of everyday practice. Few mistakes can be made, and most difficulties can be overcome, if certain general principles are respected. With selected instruments, an intelligent preliminary diagnosis, and a reasonable amount of time, the difficulties attending catheterization in the average case fade into significance.

As in every other branch of surgery asepsis is the keynote to success. Surgical cleanliness is so important in the examination and treatment of the urinary tract that particular emphasis will be laid upon this aspect of the subject. Those who ignore the strict rules for the prevention of infection either live in a fool's paradise or are fortified by some form of good fortune denied to the majority. The ominous references in the older textbooks to catheter and urethral fever, rigors, alarming rises of temperature, associated sometimes with suppression of urine and ultimate death, are significant and to the point. In the modern books the note of warning is never omitted, the authors who have specialized in the subject make a point of emphasizing the tragic train of events which may follow the passage of an infected instrument. Thomson-Walker states that urethral fever in all its forms is septic in origin. " The infection either originates in a septic instrument, or the urethra is already infected or becomes infected by septic urine." " Infection," says this authority, " is most frequently produced by a septic instrument." To emphasize the dangers of microbic contamination he adds that the passage of a catheter must be regarded as an operation of the first magnitude. Joly, Harris, Bumpus, Hamilton Bailey and other well-known writers take a similar point of view.

It may be reasonably asked, especially by those whose work is not confined to one branch of surgery, why all this insistence on a standard of asepsis which is accepted and practised by every competent surgeon? The fact is, that a certain laxity has arisen in dealing with the urinary bladder. This laxity has its birth in the knowledge that a healthy bladder can cope effectively with large numbers of pathogenic organisms, and that many patients are still alive who have practised self-catheterization for years. (One patient died after fifty-four years of self-catheterization.) These isolated facts give a false sense of security. It is established beyond doubt that the remote mortality of catheterization with unsterilized or improperly sterilized instruments is very high. (Thomson-Walker.) I have had many opportunities of comparing the results of catheterization when rigid aseptic technique was practised and again when the methods of asepsis were primitive or lax. There is, in reality, no comparison. In the former case anything more than a very transient discomfort was seldom seen, in the latter few patients escaped without some minor or major complication. Unfortunately, it is not always recognized by those responsible that unpleasant sequelæ are due to the introduction of avoidable sepsis. The matter will be referred to again when dealing with the indwelling catheter and irrigation. The avoidance of sepsis, or of additional sepsis, during the process of catheterization, is not a complicated or difficult matter.

STERILIZATION OF CATHETERS

All modern catheters can be sterilized by boiling. The metal instruments require no special attention, rubber catheters boil indefinitely, but should be tested before use, as in time they tend to rot and may break in the bladder. Gum-elastic catheters of the modern brand may also be boiled, but they should either lie on an instrument tray within the sterilizer, or be wrapped in a towel or gauze before immersion. If they are allowed to lie at the bottom of the sterilizer the polish may be destroyed by too close proximity with the gas or electric heater underneath. To protect the surface polish, gum-elastic instruments must be carefully lifted from the boiling water with a broad-nosed forceps. They are too pliable when taken from the sterilizer but resume their rigidity on cooling.

When a catheter is to be used it is a good plan to have some simple sterilizer, such as a fish kettle, near the patient. A saucepan or other kitchen utensil serves the purpose in an emergency. The instrument is lifted out of the boiling water with forceps and handed directly to the surgeon, or laid on a table covered with a sterilized towel. A second towel is laid over the catheters. These remarks apply equally to any accessories such as knives, scissors, needles, and syringes that may be required. Sharp instruments need boiling for the same reasons as all other instruments. But they can be protected by wrapping them in gauze and by separating them from other instruments during sterilization. Trays, sterilized water and antiseptic solutions should be avoided ; they open the door to errors in technique. Boiling water, a table, and a few sterilized towels are, in fact, the only essential requisites so far as the instruments are concerned.

PREPARATION OF THE PATIENT

As a rule the patient is directed to empty the bladder. This is necessary for the subsequent estimation of residual urine and is an advantage when local anæsthesia is employed. The prepuce is retracted and the glans thoroughly washed with some suitable solution of preparations such as lysol, dettol or biniodide in spirit. The skin of the scrotum, penis, lower portion of the abdomen and inner side of the thighs is similarly treated before the application of sterile sheets or towels. The penis is wrapped in sterile gauze. The towels must not be used in a niggardly fashion, they should cover a wide area in order that the hands of the surgeon or the shaft of the catheter may be protected from contamination during a prolonged or difficult instrumentation.

The anterior urethra harbours many organisms. It is never quite certain that a catheter can be passed without some slight trauma to the lining epithelium. The smallest microscopical break in this lining may allow the escape of organisms or their products into the tissues beyond. On the other hand, microbic infection may be carried by the catheter into a bladder already suffering from the effects of prostatic or other obstruction. Infection of the stagnant urine and cystitis may be the result. Washing out of the anterior urethra should always be practised before the passage of an instrument. This can be accomplished in the absence of special apparatus, with any syringe, the nozzle of which is suitable for insertion into the meatus. The variety shown in Fig. 1 is effectual. An ounce of solution is injected into the urethra and allowed to flow back by removal of the syringe. The process is repeated several times. Weak biniodide solution, dettol solution, oxycyanide of mercury (1 in 1,000) or in fact any non-irritating antiseptic which is at hand will serve the purpose.

LOCAL ANÆSTHESIA

In uncomplicated cases a catheter may be passed painlessly without the aid of anæsthesia. More frequently, however, catheterization is indicated in the presence of obstruction, due to stricture or prostatic enlargement, or following various operative procedures. In such cases the difficulties may be considerable. They are rendered much less formidable if a local anæsthetic has been effectively employed. At All Saints Hospital local anæsthesia is used as a routine. The late Mr. Canny Ryall was insistent on the employment of local anæsthesia before instrumentation of the bladder and urethra. " It seems incredible," he says, " that many urologists at the present time condemn their male patients to instrumentation of the urethra, of which the posterior segment is extraordinarily sensitive, without any preliminary anæsthesia." " Surely such practices are reminiscent of the middle ages and the tender mercies of the Inquisition." Like most pioneers, he expressed his opinions with some force.

In many respects Canny Ryall's teaching was heterodox, but it has been well said that heterodoxy is synonymous with progress, orthodoxy is but another name for standing still. Local anæsthesia, as recommended by Ryall, is admirable ; not only does it ensure the painless passage of instruments through the urethra into the bladder, but it also permits painless operations by cystoscopic methods. Catheterization of the ureters, fulguration of villous tumours, and various intravesical surgical procedures are greatly simplified by this preliminary local anæthesia.

Frequent warnings have been given against the use of cocaine in the urethra. Canny Ryall found that the evil reputation attributed to cocaine solutions is mainly due to strengths exceeding 1 per cent. Cocaine is certainly the anæsthetic of choice. Its action is enhanced by the addition of bicarbonate of sodium and chloretone. No ill-effects follow the use of the solution recommended by Ryall and, if properly applied, its action is certain.

The composition is as follows :—

℞	Cocaine hydrochloride - - - -	6 grains
	Sod. bicarb. - - - - -	6 grains
	Chloretone - - - - -	3 grains
	Aquam destill. ad - - - - -	2½ ounces

Half an ounce of this solution is used to produce complete anæsthesia of the urethra. The solution must be freshly made, warmed, and eight drops of adrenaline added to localize and prolong the anæsthesia.

METHOD OF APPLICATION

The patient is directed to empty the bladder. The urethra is irrigated and the penis and surrounding area prepared in the manner already described. The anæsthetic solution is introduced into the urethra by a glass syringe with a rubber bulb (Fig. 1). The syringe is held in the right hand, the nozzle is pressed firmly into the meatus. The lips of the latter are pressed snugly together on the nozzle by the thumb and forefinger of the left hand. One fluid drachm (3·5 c.cm.) is injected. The syringe is removed, the meatal lips are held, and the entire penis is grasped tightly with the left hand. By this means the fluid is forced into the deeper portions of the anterior urethra. The fingers of the right hand are now passed under the scrotum until they are in contact with the fingers of the left hand grasping the penis. Pressure is exerted on the perineum from the scrotum towards the anus. In this way the anæsthetic fluid is massaged into the posterior urethra

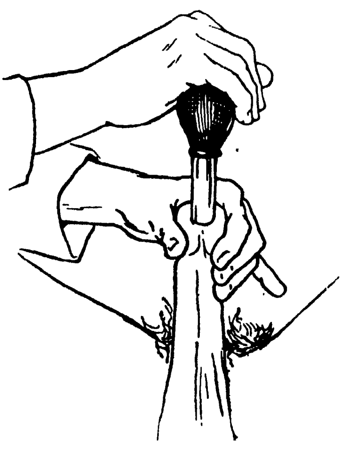

Fig. 1.—The local anæsthetic is injected with a glass syringe to which a rubber bulb is attached. On withdrawal of the syringe the lips of the meatus are held together with the fingers of the left hand.

(Fig. 2 and 3). When the meatus and penis are released no fluid should escape. A second drachm of the fluid is injected as before into the anterior urethra and a penile clamp applied to prevent its escape (Fig. 4). After the lapse of five minutes the penis is again grasped, the clamp is removed, and the fluid once again massaged into the posterior urethra. The process is repeated until four drachms have been introduced. The whole procedure occupies about fifteen minutes. If good results are to be expected the surgeon must have patience and await this fifteen minutes before attempting any instrumental work. I have seen operative procedures begun long before the local anæsthetic had time to act, and surprise expressed when the patient was conscious of pain. The alternative to this form of local anæsthesia is low spinal-block or sacral anæsthesia.

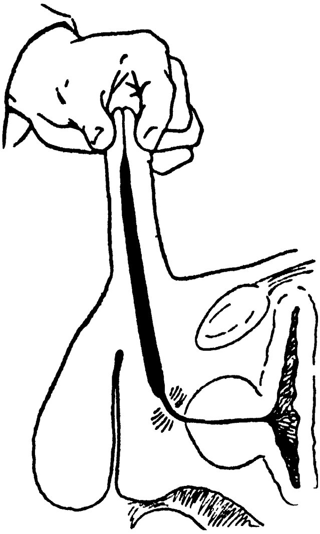

FIG. 2.—The anterior urethra is distended with local anæsthetic solution.

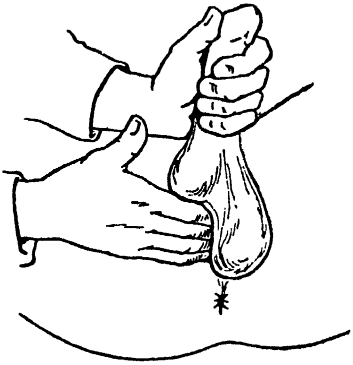

FIG. 3.—The penis is grasped with the left hand to force the solution backwards. The right hand massages the solution into the posterior urethra

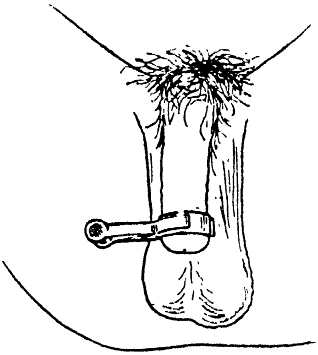

FIG. 4.—After a further injection of local anæsthetic into the anterior urethra a penile clamp is applied to prevent its escape.

PASSAGE OF THE METAL CATHETER

Most of the surgeons whom I have observed prefer the patient to be in a modified lithotomy position. The buttocks are brought to the end of the table and the legs are spread apart and supported by low crutches or suitable slings. Curiously enough many of the modern operating tables are not constructed to support a patient comfortably in this position. The surgeon stands between the legs. This permits *inter alia* easy access to the perineum, and a finger can be inserted into the rectum without difficulty. If the patient lies prone—as some prefer—the surgeon stands on the left side of the table. The penis, surrounded with sterile gauze, is held upwards with the left hand, in a midline position, pointing obliquely towards the ceiling.

There is much to be said in favour of a metal catheter in doubtful cases or if the object is merely to empty the bladder. The condemnation of metal catheters in many books is far from convincing. It is difficult to understand the fear of trauma and of the production of false passages. There appears to be no such fear when cystoscopes, lithotrites and the various metal appliances used in endoscopic resections are passed. The discarding of metal catheters has followed fashion much more than argument or reason. In practised hands, if rapidity and force are always avoided, the metal catheter is in many respects more satisfactory than any other. The sterilization is more certain, there can be no buckling or kinking, the size, direction, and condition of the urethra can be estimated with some accuracy. It is advisable to employ a familiar instrument. In all branches of surgery it makes a difference, when the weight, the curves, the length, and the various details of construction of instruments are well known by the experience of constant use. It is the same in sport. A strange tennis racquet or golf club may spoil the game. The appliance which suits the hands and temperament of one surgeon will spoil the operative work of another.

If a metal instrument is employed, it is taken from the sterilizer, and while still warm is smeared with freshly sterilized liquid paraffin, glycerin, or olive oil. Lubricants obtained from previously opened collapsible metal tubes are not so safe. The nose of the instrument is introduced into the meatus while the shaft lies in a position approximately parallel to Poupart's ligament. The left hand pulls the penis well forward on to the catheter. The shaft of the latter is rotated until it lies in the line of the linea alba, between the umbilicus and pubes. The instrument is now gradually raised until the point has travelled to the region of the bulb. At this stage, if difficulty is experienced, the progress of the catheter may be accelerated by pressure on the perineum or a finger in the rectum. The handle of the catheter is now vertical ; the nose is entering the membranous portion of the urethra. Finally the handle is gently lowered between the thighs, the tip is in the bladder, urine flows, and free rotation of the instrument becomes possible. A metal instrument as a rule overcomes any spasm of the compressor urethræ muscle if slight pressure is exerted and a few seconds allowed to elapse. If a local anæsthetic has been employed, delay by spasm is seldom experienced. If spasm is prolonged and persistent, the catheter may be connected with a funnel or douche and hot lotion allowed to run in under moderate pressure ; the spasm gives way, and the catheter slips readily into the bladder.

THE GUM-ELASTIC AND RUBBER CATHETER

The *coudée* variety is best for general purposes. If provided with a stylet it can be curved and made semi-rigid resembling the metal instrument. The catheter is taken from the sterilizer, allowed to cool, and is lubricated in the same manner as the metal variety. It should be lifted by its proximal end ; no part which is to enter the urethra should be touched. The penis, surrounded by gauze, is held upwards with the left hand, the nose of the catheter is introduced into the meatus and the instrument is easily insinuated onwards into the bladder. In difficult cases of prostatic middle-lobe obstruction the catheter is passed as far as the obstruction. If a stylet is employed it is withdrawn half an inch when the obstruction is reached. This renders the tip of the catheter mobile and for all intents and purposes it is converted into the bi-*coudée* type. The mobile nose of the catheter as a rule slips over the obstruction without difficulty. Spasm (as in the case of the metal instrument) is overcome by a delay of a few seconds or by allowing some solution to flow through the catheter. As an indwelling catheter the gum-elastic has many advantages ; I have, however, a preference for the rubber catheter when drainage and irrigation by the urethra are contemplated. Occasionally trouble is experienced by intravesical kinking when the rubber is too soft, and occasionally the eye of a rubber catheter is not sufficiently large to provide adequate inlet and outlet in very septic cases. The construction of modern rubber catheters is aimed to overcome these difficulties. In the case of the rubber catheter there is no varnish to perish, it can be boiled indefinitely, when indwelling, it permits the penis to lie in a comfortable position, and drainage is facilitated. The uncomfortable splinting of the penis with a rigid or semi-rigid instrument is avoided.

The rubber catheter requires more lubrication but is passed in the same manner as the gum-elastic. The pliability is a safeguard against trauma, but this advantage is outweighed by the necessity for additional handling during its passage through the urethra. If the operator wears gloves or only handles the catheter with gauze the chances of infection are very small. A stylet may be used if the eye of the catheter is suitably placed, or a hole may be burnt with a red hot needle, to receive the point of the stylet beyond the eye.

THE INDWELLING CATHETER

A rubber or gum-elastic catheter is used for continuous drainage and irrigation of the bladder during the preparation of certain cases for prostatectomy, after endoscopic resection, during the treatment of certain forms of cystitis, in cases of traumatic rupture of the urethra, and many other conditions. The manner of securing the catheter in the bladder is of some practical importance. There are three simple methods. The first is to encircle the penis with strips of adhesive and to connect these to the catheter just beyond the meatus by a few narrow strips of the same material (Fig. 5). This is a some-

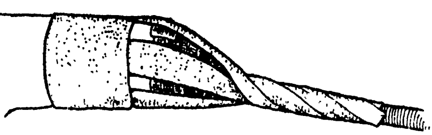

FIG. 5.—A common method of fixing indwelling catheter. More security is obtained if two pieces of adhesive encircle the penis. The longitudinal strips are secured between these.

what crude arrangement. It is difficult to change the catheter without removal of the adhesive from the penis. This is a painful process. Abrasions on the glans may be caused by the longitudinal strips of strapping. The exposed meatus may become inflamed and be the starting-point of an anterior urethritis. If the meatus and glans are protected by " Bipp" or suitable ointment and sterile gauze placed beneath the adhesive strips, these untoward sequels may be avoided.

The second plan is to use " pipe cleaners " as suggested by G. R. Davis. They are pliable and can be bent to avoid contact with the glans. The method of application is shown in the diagram. To change the catheter, the adhesive which fixes the " pipe cleaners " to the penis need not be disturbed (Fig. 6).

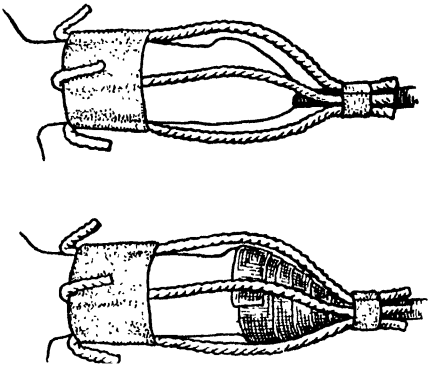

FIG. 6.—" Pipe cleaners " as a method of securing the indwelling catheter.

A third method is suggested by Riba of Chicago. He fixes loops of half an inch linen tape to the adhesive which surrounds the shaft of the penis. The loops are attached ¾ in. apart and are long enough to extend over the tip of the glans. A short piece of the tape is passed through the loops and tied round the catheter by an ordinary bow knot. A small circular strip of adhesive is passed round the catheter just proximal to the knot to prevent the catheter slipping outwards (Fig. 7 and 7a). Whatever method is employed the orifice of the meatus should be lightly smeared with " Bipp " and the glans surrounded by sterile gauze.

Finally, the fixation material and penis and the portion of the catheter entering the urethra should be bandaged with sterile gauze. Care must be taken when fixing the catheter in position not to encircle the penis too tightly with adhesive, or œdema will surely follow and necessitate the division of the encircling band.

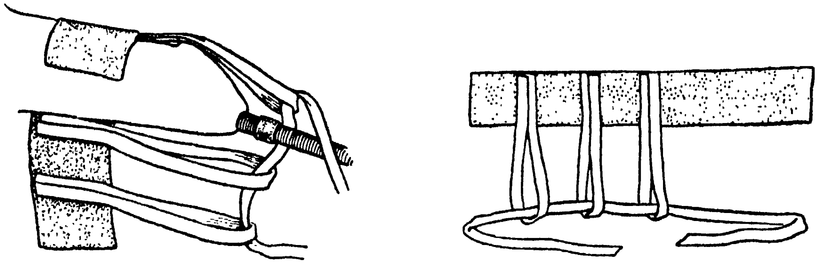

FIG. 7 and 7a.—Loops of tape and adhesive secure the catheter, especially in cases in which frequent change is required.

IRRIGATION

If the indwelling catheter is indicated, irrigation is also indicated. It may be required continuously, every few hours, or only once a day. The solutions commonly used are silver nitrate (1 in 10,000), acetic acid ($\frac{1}{2}$ per cent.), useful in alkaline cystitis with a tendency to encrustation, oxycyanide of mercury (1 in 1,000), permanganate of potash (1 in 5,000) and mercurochrome (1 per cent.). The large glass irrigators in common use, unless carefully supervised, are not always surgically clean. They are cumbersome and carry heavy rubber tubing, the whole apparatus may be far from germ free at the moment of use. They often stand uncovered and exposed to contamination from dust and air. To overcome these dangers in the Mayo Clinic a nickel coffee urn takes the place of these glass containers. The urn rests on a gas burner or electric heater which enables the solution to be boiled in situ.

For everyday purposes the common glass funnel with tubing and glass nozzle fulfils all requirements. The bladder is washed out in an exactly similar manner to that employed in the case of the stomach or rectum. A large syringe of the Thomson-Walker variety which holds six or eight ounces of solution is useful as an alternative. The funnel, tubing or syringe can be boiled and taken direct from the sterilizer for immediate use (Fig. 8).

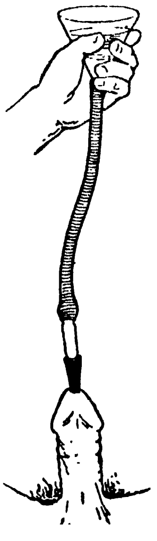

FIG. 8.—Irrigation of the bladder with tube and funnel.

DRAINAGE

On no account should the indwelling catheter be allowed to drain into a bottle in the bed between the patient's legs. The comments of S. H. Harris on this subject are as follows : " The most careful aseptic and antiseptic ritual must be observed in the case of the indwelling catheter. Any slovenliness in this regard, apart from any immediate ill-effects, will reap its own harvest of post-operative septic sequelæ." " The method, so often seen, of allowing the open end of the catheters to drain into a urinal between the patient's thighs, is fraught with danger, and should no longer be tolerated ; the way is wide open for infection which is not slow to develop." The catheter should be drained by a length of rubber tubing to a bottle at the bedside. The bottle contains antiseptic solution into which the tubing dips. It is usual to change the catheter every third day, but with the new stiff variety of rubber a change once a week or ten days is often sufficient. Any carelessness during the introduction, fixation, or daily management of the catheter leads to infection and complications, which may necessitate frequent change or occasionally permanent withdrawal.

DANGERS

Sepsis and trauma are the common dangers but attention must also be drawn to the well-known contra-indications to rapid emptying of the bladder by catheterization or other means. The chief contra-indication is obstruction from enlarged prostate with overflow incontinence. In such a case there is frequent dribbling. The bladder usually can be felt or seen distended above the pubis. Sudden emptying of such a bladder may be followed by sudden death or by suppression of urine and ultimate death. Signs and symptoms of potential uræmia should be sought before passing a catheter in elderly men. A temptation to measure the amount of residual urine in such cases must be resisted. A gum-elastic or rubber catheter, the proximal end of which is closed with a spigot, is passed in the usual manner. No urine is allowed to escape. The spigot is removed and a length of rubber tubing is instantaneously connected with the catheter by means of a glass douche nozzle. The tubing is closed with a screw clamp near the penis.

Murphy's glass dripper (as used for rectal saline, the glucose drip or slow blood transfusion) is introduced into the tube.

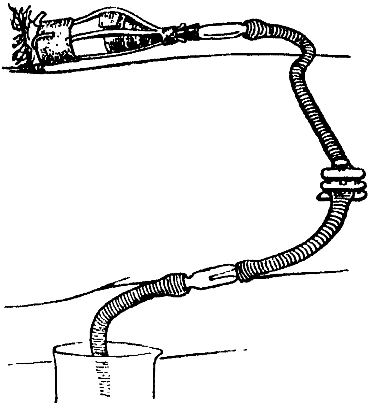

FIG. 9.—Slow decompression of the bladder.

The screw clamp is now gradually loosened until urine is seen to escape drop by drop into a bottle by the bedside (Fig. 9). This slow decompression should be continued for two or three days. In an emergency, when equipment is not available, a fine hypodermic needle may be plunged through the wall of the catheter (closed by a spigot) and the urine allowed to escape slowly through this needle. I adopted the first plan for many years with satisfactory results, but slow decompression with more accuracy may be attained by hydrostatic arrangements, the details of which have been described by van Zwalenburg, Hamilton Bailey and other leading authorities.

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THE TREATMENT OF SEA-SICKNESS

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OF the causes and treatment of sea-sickness it may be said that there are few subjects upon which such a diversity of opinion is held, and with so little sound reason. It is a subject upon which most people hold their own views, which they will defend, if need be, with considerable warmth ; and even the trained medical mind will occasionally fall into the error of advocating a particular remedy on the evidence of a single case. Those who imagine that the duties of a ship surgeon consist largely in administering to the sea-sick would be surprised to know what a small proportion of sufferers seek medical aid. Sea-sickness is commonly regarded as an act of God, and not really a medical matter at all. Consequently the victim can always be sure of a wealth of advice from more fortunate fellow-travellers as to what he should or should not do. This was the way of the ancient Babylonians, of whom Herodotus wrote :

> " They bring out their sick to the market place, for they have no physicians ; then those who pass by the sick person confer with him about the disease, to discover whether they have themselves been afflicted with the same disease . . . or have seen others so afflicted ; thus the passers-by confer with him, and advise him to have recourse to the same treatment as that by which they escaped a similar disease, or as they have known to cure others."

The main reason for this confusion of thought is doubtless that there are many possible causes of sea-sickness, direct or contributory, at work in a continually changing environment, producing reflex responses which are further diversified according to the mental and physical constitution of the individual. Thus there are as many possible varieties of sea-sickness as there are travellers—even more, for a patient's response to-day may not be the same as it was yesterday. The problem of treatment is simplified to some extent by the fact that this combination of infinitely variable factors resolves itself eventually into a disturbance of the autonomic nervous system. Although it may be doubted if any two cases of sea-sickness are ever exactly alike, it is possible to classify them according to the predominance of certain signs and symptoms.

The extreme types are manifested in augmented activity of either the parasympathetic or the sympathetic division of the autonomic nervous system—conditions described as (*a*) " parasympatheticotonia " (or more conveniently but less accurately " vagotonia "), and (*b*) " sympatheticotonia." Between these extremes there lies a scale of innumerable gradations, most cases showing a preponderance in one direction or the other. It will be readily understood that the successful treatment of any case of sea-sickness depends upon a clear understanding of the clinical characters that distinguish one group from another. Variations in tone may be interpreted, in most cases with reasonable precision, by a careful study of symptoms and signs.

VAGOTONIA

The classical symptoms of sea-sickness are usually supposed to be nausea and vomiting, but the vagotonic may suffer extremely without either of these. He commonly complains of severe and constant *headache* (which may be occipital or vertical in distribution), and a " dizzy " feeling which may or may not be recognizable as true *vertigo*. Physical and mental *lassitude* are very characteristic. Vague " *squeamishness* " is more common than pronounced nausea. If vomiting occurs, it may be on one occasion only, or at long intervals. It is apt to be sudden and unexpected, i.e. purely reflex. Nausea, if previously felt, is usually relieved for a considerable time by vomiting. Some vagotonics *salivate* profusely, even without nausea. Initial diarrhœa sometimes occurs in vagotonia, but constipation is more common in all types.

Vagotonia seems to be more common among men than sympatheticotonia. Pepys painted a clear picture of vagotonic sea-sickness. On the 7th of April, 1660, he wrote, " the wind grew high, and . . . I began to be dizzy and squeamish. . . . After dinner, and all the afternoon, I walked upon the deck to keep myself from being sick." Next day he reports : " Very calm again, and I pretty well, but my head aked all day."

Objectively the typical vagotonic shows extreme pallor, with cold extremities and an attitude and expression eloquent of abject misery ; not that melancholy *per se* is a monopoly of any one group. The eyeballs appear sunken, and their tension is often low. The pulse rate is usually below 70 ; it may be 60 or less. The blood pressure, commonly low in health, falls further in sea-sickness.

SYMPATHETICOTONIA

Most sea-sick women exhibit sympatheticotonia, a very different picture. *Nausea* is invariably present ; *vomiting* is frequently repeated ; and *retching* tends to continue at intervals even after the stomach is empty. Headache is not a prominent symptom; if present, it is usually *frontal*, and is more likely to follow vomiting than to precede it. When vertigo occurs, it is apt to come and go with intermittent variations in intensity of nausea.

The demeanour of the sympatheticotonic reveals an expression of fear or agitation that is absent from the abandoned despair of the vagotonic. The patient is restless and excitable, the face occasionally flushed. The pulse rate is commonly 80 or more. Blood pressure, if comparisons with conditions in health are possible, will usually be found to have risen slightly ; but the difference may be insignificant, and in the circumstances not demonstrable. In estimating blood pressure at sea it is important to remember that mercurial instruments are useless in rough weather, as the mercury column fluctuates with the movements of the ship.

Table 1

	Vagotonia	Sympatheticotonia
Nausea	Variable	Constant
Vomiting	Absent ; or only at long intervals	Frequently repeated
Relief of nausea after vomiting	Usually marked	Slight, transient
Headache	Early, presistent ; often occipital or vertical	Late if present ; usually frontal
Vertigo	Early	Late
Pulse rate	Often 60 or less	Often 80 or more
Blood pressure	Low	May be high

It must be repeated, and continually borne in mind, that the above-noted points of distinction apply in their entirety to extreme types only. Most sea-sick sufferers manifest a combination of the two tendencies. As it is of the first importance to recognize which predominates, their main differences are set forth in Table 1.

TREATMENT

Treatment may be conveniently discussed under two heads, (1) Preventive, and (2) Remedial. The requirements of preventive treatment will be determined to a great extent by the length of the contemplated voyage. A nervous passenger sailing from Dover to Calais may be protected from the ups and downs of the passage by an adequate dose of any convenient hypnotic. But on a transatlantic voyage, or on a pleasure cruise lasting perhaps even longer, a different standard of prophylaxis is desirable. The object in this case is to enable the traveller to make the voyage, if possible, with the same ease and *insouciance* as the most seasoned sailor. It is clear that preventive and remedial treatment cannot be in any sense mutually exclusive ; the conditions of adaptation to the ship's movement are fundamentally the same although in the first case the patient is well and in the second he is sea-sick.

Preventive treatment.—Treatment before embarkation is usually a matter for the family practitioner rather than the ship surgeon. Previous knowledge of the patient's temperament, and of his habitual pulse rate and blood pressure, will be of value in predicting the probable type of his response. Therapeutic doses of belladonna, atropine, or hyoscine, three times during the 24 hours before sailing, will combat vagotonic tendencies. Sympatheticotonia may be averted by giving, in the course of the last 24 hours ashore, up to 60 grains of bromide combined with 20 grains of chloral hydrate. Either "triple" bromides or any single salt may be used ; the bromine ion is so much more important than its base that it is difficult to be sure whether the one form is any better than the other. I have found the combination of bromide and chloral more uniformly efficacious and reliable than any of the more popular barbiturates. These, however, are sometimes preferred on account of their greater convenience and palatability. I recently treated a lady, many times sea-sick before, who escaped entirely during a severe Atlantic crossing while taking one grain of luminal and 1/100 gr. hyoscine hydrobromide every six hours during the time she was awake.

In a large majority of cases it is best to make a combined attack on both vagal and sympathetic factors. The wisdom of this precaution is all the greater when the nature of the patient's response is largely a matter of conjecture. Excessive inhibition of the vagus will clear the way for uncontrolled sympathetic activity and *vice versa.* However strongly the patient's cardiovascular picture may suggest vagotonia, the very fact that he seeks advice before sailing betrays a certain apprehensiveness which sooner or later will find expression in a corresponding degree of sympatheticotonia. Further, if he has been sea-sick before, it needs no intricate dissection of his psyche to prove that fear of a recurrence will disturb his autonomic balance. Appropriate doses of belladonna, bromide and chloral, provide the best all-round protection. Besides being taken before sailing they may with advantage be continued afterwards, being gradually tapered off during the first 24 to 48 hours.

I have mentioned drugs first because they may seem to the expectant victim the greater part of prophylaxis ; but to the practitioner other methods will commend themselves as more important. These are general principles applicable to all types and conditions. First in order of time, if not in order of importance, comes reassurance. There is in sea-sickness an element of instinctive, but probably unconscious, fear—a deep-laid, primitive dread of the unknown. Subsequent treatment will gain immeasurably in effectiveness if the patient is first given a reasoned assurance that his or her sea-sickness is not an inescapable visitation of Providence, but a transitory disorder amenable to treatment.

A sufficient amount of sleep, both before and after sailing, brings the nervous system into a condition to adapt itself most readily to unfamiliar surroundings. In the sympatheticotonic patient this may have to be encouraged by the prescription of sedatives. Fresh air is essential ; first, for the avoidance of odours which, though they may not hitherto have been disagreeable, have now acquired nauseating associations; secondly, because certain autonomic disorders seem to be accompanied by deficient oxygen-exchange.

No less important than fresh air, and always to be combined with it, is the maintenance of body-warmth. The mean temperatures of 19 sea-sick (10 vagotonic and 9 sympatheticotonic) recently studied from this point of view were: axillary 97·5°, oral 98·1° F. Twenty controls examined under identical conditions showed mean temperatures of 98·1° in the axilla and 98·7° in the month—a mean difference of 0·6° F. There was no apparent difference in mean temperatures between one type and the other; which suggests that a fall in body-temperature may be brought about in various ways.

Vagotonics should be encouraged to maintain body-heat by active but not excessive exercise. Walking on deck with the eyes fixed on the horizon, which is the only certain guide to stability in a perplexing medley of varying forces, will often help to hasten the restoration of stability, especially when the senses are confused by irregular movements of the ship. Sympatheticotonics, on the other hand, respond better if resting for the greater part of the time until they have become adapted. A combination of fresh air and warmth in a semi-recumbent position will often avert disaster. Rest must be of the mind as well as of the body, and the morbid tendency to sit gazing in fascination at the waves dashing past the rail, or at the rigging swinging dizzily amid scurrying clouds, should be countered by healthy distraction. This is admittedly difficult, because few people on the verge of sea-sickness seem able to read for long in comfort, and the conversation of fellow-travellers sharing a like dread is not always helpful.

A firm abdominal binder reaching from below the pelvic brim upwards to the costal arch, applied so as to maintain a firm and even pressure, is often a source of great comfort. A similar result can be achieved, with a little more trouble to the patient, by systematic deep-breathing exercises. The application of a mustard plaster to the epigastrium sometimes seems to reduce the frequency of vomiting. As this article is not concerned with the etiology of sea-sickness, it must be left an open question whether the benefits achieved by these means are derived from physiological or psychological causes.

The importance of an easily-digested dietary combined with adequate elimination may seem too obvious to deserve mention. It is indeed so obvious that it is often overlooked. On account of the tendency to hypoglycæmia (particularly in vagotonics, and probably in the late stages of all types) and the frequent occurrence of ketosis, it seems desirable that the diet should be relatively rich in assimilable carbohydrate and low in fat. The homely stick of " barley sugar " provides a convenient and acceptable form of glucose administration. The most important single item of advice on diet is one that will be most constantly neglected unless repeated with wearisome insistence : Eat sparingly.

Remedial treatment.—When sea-sickness has declared itself, prompt and active treatment is indicated. This will include a continuance of the measures previously advised for prevention, unless circumstances have shown any of them to be unsuitable. The results of appropriate treatment show conclusively that the earlier it is begun the better is the prospect of relief. This fact alone is sufficient refutation of the fatalistic view that " Nature must take its course," and that all beliefs to the contrary are based on the fallacy of *post hoc ergo propter hoc.*

Vagotonia.—Belladonna and its alkaloids are invaluable in the treatment of vagotonia, early or late. I have found the tincture (15 or 20 minims in repeated small doses) more certain in its action, and more free from unpleasant after-effects, than either atropine or hyoscine alone. If this is not retained, one per cent. atropine sulphate should be tried. Three or four drops placed under the tongue from a pipette will be absorbed in less time than it takes to prepare and administer a hypodermic injection. Twenty drops of genatropine (Wilcox, Jozeau & Co.) have the same effect. Vasano (Schering) is a convenient form of hyoscine, being available for oral, hypodermic, or rectal use.

In addition, or as an alternative, to vagal inhibition, general stimulation has definite value for the vagotonic. Strychnine and caffeine are both useful, especially in the early stages. Exercise, preferably in the fresh air, and in the form of deck games or of walking in cheerful company, should be encouraged. An experienced passenger once told me that he had found a cold sea-water bath to provide the necessary stimulus ; an observation which I have since been able to confirm. But in most instances one has to be content with less heroic measures.

Specific stimulants to the sympathetic nervous system naturally suggest themselves. Adrenaline is too evanescent in its effects, and ephedrine too uncertain. I have recently found, that benzedrine sulphate gives results which, though variable, are sometimes strikingly successful. Recent reports have drawn attention to the uncertainty of its action. Benzedrine seems to be an exception to the general rule that a rapid result is apt to be of short duration.

Sympatheticotonia.—When there is evidence of sympathetic activity (but not otherwise) cerebral depressants are of great value. The efficacy of bromide and chloral has already been mentioned. I have tried calcibronat (Brooks and Warburton) and calbrolact (Zimmerman), both compounds of bromine with calcium, but have not found (in sea-sickness) any striking benefit to accrue from the added sedative effect of the calcium radicle. At other times luminal, nembutal, medinal, amytal, soneryl, sedormid, and others of the same class, have proved useful, but more variable in action and often less lasting in effect. Opium and its derivatives are, in my experience, inadvisable on account of their unpleasant after-effects. Chloretone (as in the much-advertised " mothersill ") is a popular remedy, sometimes of great value. It seems to have a specific sedative action on the vomiting centre. Its main disadvantage is that it may be without much effect on nausea. It is small comfort to the sea-sick sufferer to have vomiting arrested if nausea persists. Alcohol has many advocates, the two favourites being brandy and champagne. It probably stimulates reflexly, and after absorption dulls the hypersensitive nerve-centres. The fact that good quality dry ginger ale has as many " cures " to its credit as champagne suggests that the action of CO_2 on the stomach plays a part.

Another method of overcoming excessive sympathetic activity is stimulation of the parasympathetic. This is particularly desirable if the patient is becoming exhausted. Pilocarpine, subject to the usual contra-indications, is a valuable adjunct to bromide and chloral. It may be given hypodermically in doses of 1/8 to 1/6 grain ; or, if a bromide and chloral mixture is prescribed, from 1/6 to 1/4 grain of pilocarpine nitrate may be added, this quantity being distributed over four hours in small, frequently repeated doses. In suitable cases it is well borne, with remarkable absence of unpleasant side-effects.

Nature's remedy is acetylcholine, which is produced in the tissues when parasympathetic nerves are stimulated. It stands in the same relation to the parasympathetic system as adrenaline does to the sympathetic. In appropriate cases it will be found to abolish nausea and other more vague sensations of abdominal unrest ; the rapid restoration of an indefinable sense of well-being previously lost is highly gratifying. Two conditions must be realized. (*a*) Acetylcholine is useless by mouth, and dangerous intravenously; it should be given intramuscularly. (*b*) Its beneficent action is transitory, and must be reinforced by other methods of controlling sympathetic activity (e.g. bromide and chloral) if satisfactory results are to be maintained. In this connection I have had encouraging results with prostigmin (Roche), an isomer of physostigmine which if previously administered appears to prolong the action of acetylcholine, probably by delaying its normal disintegration in the tissues.

MIXED TYPES

It cannot be too often repeated that few cases of sea-sickness are exclusively either vagotonic or sympatheticotonic. He who boldly sets out to slay the dragon of sea-sickness must wield a two-edged weapon. A clinical state recognizable as vagotonia may mask some preternatural activity due to either increased tone or lowered threshold in the sympathetic system. In like manner some abnormality of vagus action may be concealed by heightened sympathetic activity. Therefore a combined attack becomes necessary.

Of all the combinations of drugs that I have tried, the most uniformly successful has been a mixture of tincture of belladonna with bromide and chloral. The relative proportions required for a " B.B.C." mixture may be judged from Table 2.

Table 2

	With predominant signs of		Intermediate type.
	Vagotonia	Sympatheticotonia	
Tincture of belladonna	15 min.	5 min.	10 min.
Bromide	40 gr.	80 gr.	60 gr.
Chloral hydrate	15 gr.	25 gr.	20 gr.

The prescription is made up to one ounce of water, the dose one teaspoonful every half-hour, slightly diluted if necessary. The mixture may be flavoured, as with spirit of chloroform or tincture of ginger, but I have not found that this improves the chances of its retention.

There is great therapeutic value in the insistence upon the frequent and regular repetition of small doses, even although the first one or two may be vomited. It is obvious that a large draught, whether palatable or not, is likely to be vomited soon after being swallowed, whereas repeated small doses have a much better chance of being absorbed. But there is an even greater psychological advantage in the fixation of the patient's attention on the passage of time and the regular recurrence of the specified interval. When three or four doses have been retained, the average patient falls asleep for an hour or more, resuming medication on waking. This interruption aids recovery rather than otherwise. Sleep itself (especially, it seems, after bromide) has a strikingly beneficial influence on the restoration of autonomic balance. From this it would appear that " Nature's soft nurse " subserves some more useful function than merely " steeping the senses in forgetfulness."

THE TREATMENT OF EPILEPSY IN CHILDREN

BY REGINALD LIGHTWOOD, M.D., F.R.C.P

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LEST it seem a trespass into the sphere of neurology for a children's physician to write on the treatment of epilepsy, it should be remembered that "fits" are a common symptom in a children's hospital, and their treatment forms a not inconsiderable part of the practice of a pædiatrician. Long ago Gowers taught that 75 per cent. of epilepsies begin during the first two decades, and an eighth of all the patients show their first symptoms before they are three years of age. Epilepsy, like mental deficiency, looms large among the diseases of early life. It is defined as an idiopathic disorder characterized by convulsive movements and loss of consciousness, repeated at intervals over a long period. The term *symptomatic epilepsy* is used for outwardly identical fits when their cause is known, for example, following a blow on the head or during attacks of hypoglycæmia; or the more inclusive designation of *convulsions* is equally suitable. Thus the essence of the so-called " diagnosis " of epilepsy lies in ignorance of its cause, a matter to be regretted but admitted. As Kinnier Wilson has said, epilepsy may be a symptom but it cannot be regarded as a disease. Strictly speaking, it would be preferable not to regard this as a diagnosis ; and yet the idiopathic epilepsies form a fairly well-defined, though perhaps heterogeneous group of recurring convulsive states which have to be treated symptomatically when, and only when, all likely organic causes have been excluded.

DIFFERENTIAL DIAGNOSIS

As recognition presents different problems in infancy and in later childhood, it is convenient to consider them separately. *Infantile convulsions* are often seen in the neonatal period at a time when birth injuries, either natural or instrumental, are likely to be the cause. There are, however, other possible organic causes, such as congenital developmental cerebral defect, the cerebral results of neonatal jaundice and the action of spontaneous cerebral hæmorrhage (as in hæmorrhagic disease of the new-born). After the neonatal period, convulsions are still commonplace episodes, but the greater number of them are not, like epilepsy, regularly repeated. Such occasionally occurring fits are most commonly the result of the reflex disturbances of infancy and gastro-intestinal causes take first place ; or they may mark the onset of simple infections, and the various forms of meningitis may be accompanied by convulsive attacks. Rickets must always be remembered as a common cause of repeated convulsions for, like tetany and laryngismus stridulus, they are among the classical nervous symptoms of the rachitic state (spasmophilia). Clearly, there are in infancy many possible causes for convulsions, and it is seldom necessary to consider the diagnosis of epilepsy until it is known that the fits are *regularly recurring* and, if they are, spasmophilia must first be excluded. When spasmophilia is suspected, signs of rickets should be looked for in the skull and the epiphyses, noting the state of the fontanelle and the ribs, and, if necessary, arranging for X-ray examination and blood calcium estimation. When the latter investigations cannot be obtained, it is of value to know that the diagnosis of spasmophilia can be excluded if, after anti-rachitic treatment has been employed for a month, there is no diminution in the number of fits.

After infancy convulsions become less common and the number of likely causes is also smaller. A young child of nervous type may, like an infant, have a symptomatic convulsion from a minor reflex cause, but an isolated convulsion in a child is more safely interpreted as an initial sign of some acute infection. Thus a child with an apical pneumonia is, for some reason which it is difficult to explain, peculiarly apt to have a convulsion and to show signs of meningeal irritation. Generally if much fever accompanies a convulsion it is unlikely to be an epileptic attack, though this rule has its exceptions, and I recollect the case of a boy who suffered from repeated epileptic attacks for a number of years and the parents stated that there was always considerable fever at the time of the attacks. On the other hand, it is known that epileptic children usually cease from having epileptic attacks during febrile disturbances such as measles. In children, as in infants, gastro-intestinal causes may lead to convulsions and *Ascaris lumbricoides* (the round-worm) is well known to produce them occasionally ; sometimes there are such pronounced signs of cerebral irritation with ascarides that meningitis may be falsely suspected.

Reflex convulsions in a child seldom occur more than two or three times, and in the face of regularly recurring convulsions epilepsy should always be suspected. The association of epilepsy with certain forms of mental deficiency, e.g. primary amentia, is a close one, though it is worth mentioning that epilepsy does not accompany the mental deficiencies of mongolism and cretinism. Repeated convulsions may be seen in mentally deficient children afflicted with cerebral conditions such as microcephaly, cerebral diplegia, epiloia (tuberous sclerosis). By definition it is wrong to include convulsions associated with such lesions within the term of epilepsy because structural changes are discoverable. The sudden onset of convulsions occurring every few days or every few weeks may mean cerebral neoplasm, tuberculoma or intracranial abscess, grave possibilities which ought to be kept in mind. Attacks of virus encephalitis are in children often ushered in by fits.

FORMS OF IDIOPATHIC EPILEPSY

Grand mal and *petit mal* are the only common varieties of epileptic attacks. Sometimes one or other form occurs alone and sometimes the patient is subject to both. It is usually held that of the two the attacks of petit mal are the more obstinate to treat. Among the rarer and less known epileptic conditions the following must be recognized : *Pyknolepsy* bears a resemblance to petit mal but pursues a different course and has an entirely different prognosis. In pyknolepsy the attacks begin suddenly and usually between four and ten years, they occur repeatedly every day, there is no warning, and mental acuity returns immediately after the lapse of consciousness, sedative treatment is very disappointing but, fortunately, the condition disappears spontaneously within a year or two and before puberty. *Salaam spasms* occur in infants. They are held to be epileptic in nature, and in most instances there is an associated mental deficiency. The condition may be suspected when the mother says that the patient's head falls forward periodically or that the body is bowed forward with the hands upraised. Bizarre movements of the limbs are sometimes seen and salaam convulsions are not difficult to recognize when actually observed in the consulting room. *Eclampsia nutans* is an even rarer manifestation of epilepsy. In this condition the patient carries out rapid nodding or shaking movements of the head during which the eyes become vacant, and respiration is quickened or irregular, and the colour may change.

PRINCIPLES OF TREATMENT

When it is established that fits in any particular patient are neither reflex, nor symptomatic of rickets or other organic disease, treatment can then be planned. First, it must be emphasized that it is wrong to begin sedative drug treatment until it is clear that the convulsions have come to stay. The decision to treat epilepsy is a serious one, for it means that sedatives are given continuously for a period of some two years, a decision which should not be taken until it seems from observation of the patient that the fits are likely to persist. In planning the treatment of an epileptic patient we have to choose a suitable drug or combination of drugs, the initial dose has to be decided, and subsequently regulated, and general advice must also be given particularly in regard to education.

The drugs.—If a single drug will do, it is a mistake as a rule, to employ more, though there are patients in whom a combination may enable success to be obtained without using an undesirably large dose of a single drug such as luminal, the quantity of which it is preferable to limit rather carefully. For this reason it is better, in the first place, to give trial to the bromides, though there are many who advise luminal from the start, particularly when the fits occur frequently. The following mixture makes a suitable beginning :—

℞	Potass. bromid. - - - -	5 grains
	Syrup. aurantii - - - -	10 minims
	Aq. menth. pip. - - - -	120 minims

Sig. 2 teaspoonfuls t.d.s. p.c.

Afterwards, the dose of bromide will require to be increased from time to time, but an increase is only indicated when further fits occur. After each increase the possibility of a bromide eruption must be remembered, although it is surprising what large amounts of bromide can be borne, particularly if tolerance is slowly acquired by gradually increasing doses. When in the case of a child of eight years, the dose of potassium bromide reaches the neighbourhood of 10 grains three times in the day, it is well to employ a combination of the three salts, sodium, potassium and ammonium. Then if the fits continue the time comes, according to the age of the patient, when further increases beyond this dosage are not practicable, though it is best not to lay down any hard and fast rule, and if for this reason a stronger sedative action is required, the drug must either be altered or combined with another. In this case there is no objection to an entire alteration of plan, and among the many suitable sedatives a choice can be made from the following : luminal, $\frac{1}{8}$ grain to $\frac{1}{2}$ grain, prominal $\frac{1}{2}$ grain, theominal (half to one tablet), syrup. bromocarpinæ 1 to 2 teaspoonfuls. These drugs are usually given in single dose daily. Chloral 1 to 3 grains, repeated, is specially useful for infants.

If it is decided to employ a combination of two sedatives, bromide and chloral are suitable for infants, and for older children the following combination may be employed : bromide and luminal, bromide and sodium biborate, bromide and belladonna, bromide and urethane. It is a sound rule to choose the safest drug which is effective, to use it in the smallest effective dose, and give it for a considerable period. As a rule, the sedative should be continued for two years, and it is a wise practice to insist that the drug is only left off gradually at the end of this time. Thus after two years of successful treatment with bromide I have known the fits to recur within a few days of a sudden stopping of the drug.

There are other methods for the treatment of epilepsy which have been suggested and given extensive trial, and passing mention may be made of the ketogenic diet and the injection of air intrathecally, but neither is to be preferred to successful drug treatment, because they are less practical in their application.

Education.—Parents will often ask whether or not schooling is advisable in the case of an epileptic child. If the fits are occurring frequently it is better that the sufferer be kept at home, but when they are partially or completely under control, schooling is not disadvantageous as regards the epilepsy, and for the child is necessary. The selection of a school becomes then a matter for consideration. There are many schoolmasters who regard the epileptic child as undesirable, but there are small schools where he is welcomed and given special attention. Such a child must not be allowed to swim in deep water and special supervision of all bathing is necessary. When adolescence is reached a motor-car should not be driven, and if cessation of the fits does not seem assured, due regard to the fact must be taken in the choice of an occupation.

THE KNEE-JERK IN HEALTH AND DISEASE

By ADOLPHE ABRAHAMS, O.B.E., M.D., F.R.C.P.

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THE knee-jerk—the response elicited by a tap on the patellar tendon when contraction of the quadriceps extensor muscle is expected—is the most convenient to test and most familiar of all the tendon-reflex phenomena. It is open to the objection that it is not a true reflex since the muscular contraction occurs too soon after the tap for the nerve impulse to have had sufficient time to travel. But, after all, the response depends upon the reflex tonus in the vastus internus, and the state of this response is an index of the integrity of the reflex arc upon which this tonus depends.

The contraction of the muscle may be seen or felt even if the actual extension of the leg on the thigh is not evident ; and although the most common practice is to obtain such evidence by requesting the subject to cross the knees and allow the limb to hang loosely, the alternative method of palpating the thigh for the contraction when the knees are semi-flexed and the foot is placed lightly on the ground has much to recommend it. The tap on the tendon should be smartly given with a proper percussion hammer. The old-fashioned method of employing the tips of the fingers or the edge of the hand is most unsatisfactory.

Relaxation of the muscles is a *sine quâ non* and spasticity may conceal a contraction which is interpreted as " absent." It is desirable therefore on occasion to employ one or other of the methods adopted for reinforcement, all of which methods have as their object distraction of the patient's attention by giving him some voluntary movement to perform. The best known is the method of Jendrassik in which the patient is instructed to hook his hands together and pull them apart whilst looking upwards. In Laufenauer's method the observer grasps the patient's thigh whilst the patient grasps the observer's upper arm which he is instructed to squeeze at the moment when the patellar tendon is struck. The names of Dragenesco, Krönig, and Rosenbach are identified with other methods of reinforcement which have no special recommendation.

Various adjectives are applied to description of the knee-jerk, e.g. absent, present, normal, active, feeble, diminished, sluggish, brisk, exaggerated; and, as is perfectly obvious, these descriptions are question-begging. It is impossible to define a normal knee-jerk ; it varies considerably in healthy people and in the same person at different times. It can only be said that the absence of a jerk is in the vast majority of cases an abnormality, and it is of the greatest importance, therefore, to ensure that the proper method of examination and, if necessary, reinforcement is employed to establish as a certainty that no response is elicited. To differentiate various degrees of briskness is in general valueless, an exaggerated jerk may or may not be evidence of disease. Any inequality of the two sides is always a valuable index.

Two other terms are occasionally used in regard to the knee-jerk. In cerebellar disease the leg instead of falling back to its normal position of rest may continue to swing to and fro like a pendulum. A somewhat similar phenomenon is encountered in chorea, in consequence of muscular hypotonia; the knee-jerk is then described as " sustained."

ABSENT KNEE-JERKS

As in the majority of cases an absent knee-jerk is evidence of disease it will be best to deal at once with the various causes which may be responsible and these can be comprehended by attention to the components which make up the reflex arc.

In the first place, certain *myopathies* which affect the quadriceps may be responsible and the diagnosis will be assisted by the condition of other muscles in the body.

Implication of the *afferent* path is most typically seen in tabes : not that in tabes the knee-jerk is necessarily lost since for this to occur the lumbar cord must be involved, and, indeed, early in the disease the reflex may be exaggerated. In the same category will be included some examples of dementia paralytica.

In *myelitis* in the region of the third and fourth lumbar segments with affection of the anterior-horn cells, the knee-jerk is necessarily lost. This is exemplified in acute poliomyelitis, progressive muscular atrophy, syringomyelia and Landry's paralysis. In such lesions muscular paralysis and atrophy are to be expected.

On the *efferent* side first come some forms of peripheral neuritis which involve the anterior crural nerve. The most common poisons responsible are alcohol, arsenic, lead, and those of diphtheria, beri-beri and diabetes mellitus. In any severe toxæmia, especially typhoid and pneumonia in the early stages, the knee-jerk may be in abeyance. I specially investigated this point in a large series of cases of lobar pneumonia and found that in 24·7 per cent. the knee-jerk was abolished ; in 12·4 per cent. it was with difficulty elicited ; in 44·4 per cent. it was present to a degree which would be described as normal, and in 18·5 per cent. it was definitely exaggerated. I was interested in this particular feature by a statement that the knee-jerk in pneumonia was so frequently lost in the early stage that this afforded a valuable diagnostic distinction from an acute abdominal condition. But I think that as the original observation was made without the now familiar patellar hammer, many of the examples included as absent or very sluggish would have been accepted as normal.

In complete transverse section of the cord, all reflexes below the level of the lesion are lost for a time. Inhibition of the knee-jerk may also be due to irritation of the pyramidal tract in increased intracranial pressure, especially with tumours in the posterior fossa, in early cerebral hæmorrhage, and in coma from whatever cause arising. For a short time after an epileptic fit during the stage of coma and flaccidity its absence may be detected.

Notwithstanding these various causes it is on rare occasions impossible to explain an absent knee-jerk, and its "congenital absence" is rightly or wrongly sometimes presumed. There is one curious non-syphilitic condition in which the knee-jerk is lost and a pseudo-Argyll Robertson pupil is present. Presumably congenital mal-development of certain nerve fibres is responsible. In old people little regard to its absence need be paid. It must be remembered, too, that an absent knee-jerk may be the only evidence of a peripheral neuritis and that in some instances its persistent absence is the legacy of diphtheria in the remote past.

EXAGGERATED KNEE-JERKS

Less importance is of necessity attached to an exaggerated knee-jerk since loss of control from the higher centres from whatever causes arising will lead to a brisk response and such loss of control may be of functional or organic origin. An exaggerated response is expected, therefore, in the highly nervous emotional subject and also in anyone whose control may temporarily be disturbed by ill-health. When a very brisk " exaggerated " reflex is accompanied by a flexor plantar response and normal abdominal reflex it is accepted as functional. But any other abnormality indicates organic affection of the cells of the motor area or pyramidal tract with interruption of conductivity. As intracranial causes we think of disseminated sclerosis and amyotrophic lateral sclerosis. Frequently, but not invariably, there will be spasticity of the legs. In this connection any asymmetry is of great significance.

In hemiplegia there will necessarily be inequality of the knee-jerks, that on the paralyzed side will be the brisker.

Certain poisons, especially strychnine and that of tetanus, may be responsible for an excessively active knee-jerk.

GENERAL PRACTICE

IX—LITIGATION

By ROBERT FORBES, M.B., Ch.B., J.P.

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AFTER a student has negotiated successfully the perilous straits of the final examinations and has reached the haven of medical registration, it is not unnatural that he should rest on his oars and delay action on the many suggestions from friends who desire to promote his future well-being as a medical practitioner. Life at this phase of a medical career appears to be simpler and more roseate than hitherto, and the counsels and the warnings of medical acquaintances seem unnecessarily pessimistic. It is therefore with some trepidation, but with an assurance of its truth, that I submit that immediately a person has registered his name with the General Medical Council as a newly-qualified medical practitioner, he should forthwith make application for membership of a defence organization. I am, of course, aware that some practitioners " carry their own risks " and do not subscribe to any defence society, but these must surely be blind to the dangers which surround them and unaware of the financial burdens they may be called upon to shoulder as a result of contact with a litigious patient or an error of professional judgment. The annual subscription involved in providing full cover against risks peculiar to the practice of medicine is small, namely, £1 per annum. The cover is really full cover. Every member is given unlimited indemnity against actions arising out of their professional acts or omissions—alleged or real—and the damages and costs involved in an approved prosecution or defence are met and discharged by the defence body.

PROFESSIONAL RISKS

What are these risks which a medical practitioner must face and recognize at the outset of his career? There is a risk of litigation arising from a professional mistake ; the risk of slander and libel by disgruntled patients ; the risk of wrongful certification ; and of mistakes in diagnosis. Readers will probably agree that these risks are too real and pressing to be dismissed as unworthy of attention and consideration. No matter how skilled or experienced a practitioner may be he cannot justifiably maintain that his experience is such as to warrant his discounting with impunity the risks already detailed.

The public are becoming more knowledgeable in matters appertaining to the law ; they read frequently in the daily press about practitioners answering in the Courts charges of negligence and malpraxis. They learn of the large damages which are sometimes awarded in these cases. They are aware, for example, that it is now incumbent upon doctors to urge or arrange for an X-ray examination even though the superficial appearance of the injured part suggests that there is no fracture of a bone. Every bruise and every injury cannot, of course, be X-rayed, nor indeed, is that absolutely essential. A certain amount of discretion must be exercised, and, herein lies a further risk—the risk of discrimination between a "safe" and a "dangerous" injury. Hospital practice and private practice are poles apart ; it takes considerable time for a novitiate in private practice to differentiate when to X-ray and when it is safe to do without an X-ray examination. Instances could be multiplied which indicate the grave medicolegal circumstances attendant upon medical practice, but perhaps the quotation of a few actual cases would be instructive in pointing the need for membership of a medical defence organization.

ILLUSTRATIVE CASES

MISTAKEN DIAGNOSIS

Case 1.—A newly-qualified medical practitioner secured an appointment as house surgeon in a well-known general hospital. One night he was called to examine a patient admitted after involvement in a street brawl. He came to the conclusion that the individual was suffering only from concussion. After short detention the patient was allowed to proceed home. On the way home the patient became more ill and had to be conveyed by ambulance. He arrived at the hospital again the following morning, having been sent there by his local practitioner. It was then clear that he had a fractured skull; this was proved conclusively at the post-mortem examination which ensued. Various allegations of negligence and mal diagnosis were made by the relatives and proceedings appeared to be imminent, but, owing to the intervention of a defence society, litigation did not take place. The worry associated with this case can be easily understood and its lesson was not lost on the practitioner concerned.

INJURY FOLLOWS AN EXAMINATION

Case 2.—A practitioner who occupied a junior position on the staff of a hospital received a patient who had suffered a fracture at the lower end of the right radius. This fracture had been treated by operative measures and appeared to be firmly united. He removed the splints and examined the patient. He ordered massage and passive movements and passed the patient to the appropriate department. On returning home, the patient noted a swelling in the neighbourhood of the original fracture but imagined that this was unavoidable. Next day the swelling had increased and was associated with severe pain. On reference to the local practitioner an X-ray examination was conducted and it became evident that the same bone had again been fractured in the vicinity of the first fracture and that this must have arisen at or about the time of examination by the junior surgeon. A claim was formulated against the practitioner concerned and his defence society took up the cudgels on his behalf. The matter was eventually settled by the payment of a sum considered equal to the damage sustained.

DEFERRED X-RAY EXAMINATION

Case 3.—An elderly lady had fallen down a few steps and had bruised her right buttock. She was put to bed and examined by her local practitioner. He went carefully over her spinal column and pelvis to determine whether or not any bony injury could be detected. The result of his examination was a diagnosis of severe bruising and an absence of bone injury. He suggested an X-ray examination which would have entailed a journey of several miles by ambulance, and as the patient's relatives pleaded for economy he did not insist. The patient made good progress, being carefully nursed during her illness. Eventually she was allowed to get up and about and her doctor considered that he had secured a good result. Some months later he received a solicitor's letter informing him that his late patient had been admitted to hospital suffering from a collapse fracture of the first lumbar vertebra. It is true that even had he conducted an X-ray examination at the time as proposed it might have been difficult or impossible to have located hæmorrhage into the lumbar vertebra. This is another instance in which the protection society dealt with and settled the claim.

CONTESTED CERTIFICATION

Case 4.—Certification plays an important part in the work of a medical practitioner and often forms the subject of potential or actual litigation. A practitioner was recently called to give an emergency certificate for the removal of a patient to a hospital. The patient was suffering from delusions and was a danger to himself and others. After admission the patient was detained only for one week. When released he approached his solicitors and through them claimed from the doctor concerned certain charges which had been made by the local authority for his maintenance in hospital. Proceedings were threatened in default of payment by the practitioner. The solicitor was informed by his defence organization that the certificate had been given in all good faith and had been prepared with reasonable care and that, should it be necessary, the certificate would be defended in the courts. As a result of this frontal attack nothing further was heard of the case.

ALLEGED LIBEL

Case 5.—A practitioner had occasion to report a district nurse to the secretary of the local nursing association for criticizing his methods, disobeying his instructions, and neglecting patients. As a result the nurse was requested to resign and her resignation was accepted. Two days later the doctor received a letter from a solicitor claiming damages for unjustifiable allegations with regard to the nurse's character and her professional abilities. The solicitor was informed that the practitioner had no alternative but to report the nurse's conduct and that any proceedings taken by the nurse would be defended by his defence society. Nothing further was heard of the matter.

ALLEGED MALPRAXIS

Case 6.—Awell-known surgeon had a patient sent to him suffering from dyspepsia and showing evidence of an abdominal tumour. He advised an exploratory operation, which disclosed inoperable cancer of the stomach. Gastro-enterostomy was performed with marked improvement in the symptoms and the surgeon advised the patient's husband (who was very pleased with the improvement) that this could only be temporary. Up to that date the husband had been most grateful for what had been done by the surgeon, but his attitude changed when the account was rendered, and he complained that the operation ought never to have been performed. On the advice of a defence society proceedings were instituted by the member for the recovery of his account. The patient entered a defence alleging an unnecessary operation and repudiating liability for the account. The society thereupon assumed the conduct of this matter, and within a short time was approached by the defendant, who expressed his regret for the criticism of the surgeon's treatment, but asked him as an act of grace to reduce his account. This, however, was not acceded to, and the amount of the debt was paid in full.

ALLEGED WRONGFUL DIAGNOSIS

Case 7.—Another case of some interest involved a claim by a practitioner for his fees to which a defence alleging negligence was filed and also a counterclaim for damages. The practitioner had been for some time in attendance upon the patient for certain chest symptoms which the latter feared might be due to tuberculosis. The patient, who was of a nervous temperament, was informed that his symptoms were not indicative of pulmonary tuberculosis, but to confirm this view the services of a consultant were invoked. After examination the consultant agreed that the condition was not a tuberculous one. The patient, however, was still doubtful, and it was then suggested that he should visit the Tuberculosis Officer who confirmed the diagnosis of the consultant and the attending practitioner. The patient, however, contended that the two practitioners (his own and the consultant) had by inference diagnosed that he was suffering from tuberculosis, and he claimed damages for wrongful diagnosis and the consequent mental suffering he had sustained. The case went into court, but the judge found that the doctor had not diagnosed tuberculosis and that there was no justification for the allegation of negligence; and he gave judgment accordingly.

EVASION OF PAYMENT OF ACCOUNT

Case 8.—A man suffering from a large corneal ulcer had been attended by a practitioner for some time. Not satisfied with the progress, he summoned a consultant, who approved the treatment provided. The practitioner throughout the after-treatment kept in touch with the consultant, who assisted and guided him in the conduct of the case without any additional cost to the patient. As a result of the ulceration some scarring occurred with a consequent defect of vision. The doctor rendered his account, and the patient, after ignoring it for some time, subsequently promised payment. No payment being forthcoming, the practitioner pressed, and eventually issued a default summons. The defendant entered a defence that, due to the plaintiff's professional negligence, his sight had been "practically ruined." The practitioner's defence society applied for particulars of the alleged negligence and wrote on several occasions to the defendant demanding these particulars; these, however, were not furnished. When the case came on for hearing the judge adjourned it for the defendant to deliver particulars asked for within fourteen days. The particulars were not delivered and judgment was accordingly entered for the practitioner with costs. The defendant, however, was out of work and has remained out of work ever since, the result being that not one penny of the debt or costs has proved recoverable.

ACCIDENT DURING DENTAL OPERATION

Case 9.—A practitioner was asked by a local dentist to administer an anæsthetic for dental extraction. He did so, but first carefully examined the patient to ascertain her fitness for the anæsthetic. Several teeth were removed, and at the conclusion of the operation the dentist informed the practitioner that one of the extracted teeth was missing. Careful search was made, but it could not be found. The practitioner accordingly suspected that the patient had either swallowed or inhaled the tooth. He carefully examined the patient's chest but found no evidence that the tooth had been inhaled, as there was no interruption or alteration in the breath sounds. He advised the patient to have an X-ray examination and at once telephoned to arrange an appointment and suggested that until the time of the appointment she should rest. She did not follow his advice, but went herself and was X-rayed, with the result that a tooth was found in her lung. The patient was advised to go to the local hospital, but preferred a London hospital, and was for a long time gravely ill in one of the London hospitals. There was great difficulty in removing the tooth, and at one time the surgeon despaired of her life. She recovered and later started an action against the dentist and the practitioner jointly, and after the action had progressed for a while a defence society was approached by the plaintiff's solicitors, who inquired whether it was prepared to make any payment in settlement. The society repudiated liability for the practitioner and stated that it was not prepared to discuss terms in any shape or form and it was for them to decide whether or not they should continue their action. The result was that in due course the dentist, who was clearly the only party liable, effected a settlement by a payment to the plaintiff, and the action against the practitioner was not continued. A withdrawal of all charges of negligence against the practitioner was also obtained.

DELAYED CLAIM

Case 10.—A doctor attended an elderly woman who had slipped on a step and injured her hip. A most careful examination failed to reveal any sign of fracture, and the case was regarded as a severe strain. The condition improved slowly, but the patient some months later had a cerebral embolism, causing partial paralysis of the leg and considerably increasing her disability. Nearly two years after the accident an X-ray examination revealed an old fracture through the inter-trochanteric line, and a claim was made against the practitioner for compensation on the ground of faulty diagnosis. His defence society went fully into the facts of the case and informed the solicitors that no liability could be accepted and made it clear that it would defend proceedings. The claim was at once dropped.

OPHTHALMIC CASE

Case 11.—While acting as house surgeon at a hospital, a woman practitioner had under her care a man who underwent an abdominal operation. Later in his convalescence he developed a corneal ulcer, which was seen by the ophthalmic surgeon and treated appropriately. On being discharged from the hospital the patient signed a form expressing his satisfaction with the treatment which he had received. More than a year afterwards the practitioner received a solicitor's letter claiming compensation for the loss of the eye, owing to the alleged lack of attention which he had received at the house surgeon's hands. A letter written on the latter's behalf denying all liability effectively disposed of the matter.

DISPUTED ACCOUNT

Case 12.—A practitioner was called to see a little girl who had an indefinite rash. She was kept under careful observation, no diagnosis being made. Three days later her brother developed typical scarlet fever from which he made an uneventful recovery. The girl, however, became very ill, serious complications supervened, and the practitioner remained in attendance for many months. When the account was rendered the father wrote alleging that the protracted and serious nature of his daughter's illness was the result of the inability of the practitioner to diagnose the condition in the initial stages, and suggested that the account should be cancelled. The practitioner was advised to reply that he could recognize no justification for this suggestion and would take proceedings for the recovery of his fees if they were not paid. This he had to do, but when the summons was issued the father paid the account in full.

PERMISSION TO OPERATE

Case 13.—A local practitioner sent a child into hospital with a note "? appendicitis, for X-ray examination." The mother signed the usual form authorizing the doctor in charge to carry out the necessary treatment. The hospital surgeon did not consider that the X-ray examination was necessary and after observing the child for two days he operated and removed the appendix. The child was treated as a private patient and when the account was submitted no notice was taken of it until the practitioner's solicitor pressed for payment. The father, through his solicitor, repudiated the claim, stating that the operation had been performed without the permission of either parent and that legal proceedings were contemplated. The practitioner was advised to sue for his fees and this he did. A day for hearing was arranged, but on the morning of the trial a cheque was paid into court for the full amount of the claim with costs.

BURN BY HOT-WATER BOTTLE

Case 14.—A practitioner practising as a radiologist had referred to him for X-ray treatment a man suffering from an internal malignant disease. It was agreed that a course of treatment should be given for a specified sum. After three treatments had been given complications unconnected with the X-ray treatment necessitated its interruption and the man was removed to his home. A modified account was submitted for the services rendered. Four months later the patient's wife wrote asking for details of the account, alleged that the treatment had had disastrous effects and that as a result of negligence a " pigmented burn " had resulted. Actually the patient had been blistered by a hot-water bottle. The blister healed in a few days, was remote from the area where the treatment was given, and the practitioner was in no way responsible for it. He was, therefore, advised to send a detailed account and to press for his fees whilst denying the allegation of negligence. The wife persisted in her charges but offered to pay a portion of the account in full settlement. The radiologist was recommended to refuse this offer and to insist on payment of his charges in full. This he did and received a cheque in full settlement of the amount claimed.

AURAL CASE WITH FACIAL PARALYSIS

Case 15.—A practitioner was called to see a child and found that she had an influenzal attack with otitis media. He saw her the next day when she was much better, and though both ears were discharging, there was no evidence of acute mastoid disease. He instructed the mother to keep him informed of the child's progress, and hearing nothing further called again four days later. He then found that the child was much worse, the mastoid being obviously involved. As the mother was not at home he left a message telling her to call and see him and later instructed her to take the child to hospital. Four months later he received a solicitor's letter alleging that, owing to his negligent treatment, the operation which had to be performed was of such gravity that a facial paralysis had resulted, and that the father held him responsible. A letter was drafted by the practitioner's defence organization for him to send denying all responsibility in the matter and as a result nothing further was heard of the case.

BROKEN NEEDLE

Case 16.—While a practitioner was administering an intramuscular injection into a patient's buttock the patient flinched, as a result of which the needle snapped and before he could seize the broken piece of the needle it was drawn into the tissues by muscular spasm. The patient was an exceedingly " neurotic" individual and her husband had deeply impressed upon the practitioner that in no circumstances was he to disclose to her the nature of any ailment for which he might be attending her. He felt that he was bound by this and accordingly allowed the patient to return home without telling her of the broken needle. Prior to her leaving he asked for her home address, as he knew the family had moved recently. The patient being an illiterate woman and a foreigner, gave him the wrong address and as a result he was unable to carry out his intention of going to see the husband so as to inform him of what had occurred. A few days later, however, he was called to see the patient who was complaining of discomfort at the site of the injection, whereupon he told the husband what had happened and arranged for the patient to be taken to hospital where the needle was successfully removed.

An action for damages was instituted against the doctor and after a hearing of several days before a judge alone the plaintiff was awarded £5 5*s*. damages, these damages being awarded her by reason of the practitioner's failure to inform her of the fact that the needle had broken and of his thereafter allowing her to proceed home by bus, a distance of some two miles. On the main issue, namely that of negligence in the performance of the injection, judgment was given in favour of the practitioner.

While one can sympathize with the practitioner in his failure to inform the patient of what had taken place in the light of the expressed request of the husband, one can also appreciate the view of the judge, that he was none the less under duty to do so or to refuse to allow her to proceed home until he had communicated with her husband. The principle for which the Medical Defence Union has always contended, namely that the breaking of a needle in such circumstances is an accident for which a practitioner cannot be held responsible, was upheld.

CONCLUSIONS

(*a*) No one engaged in the practice of medicine, in whatever branch, is immune from attack by litigious patients.

(*b*) No one can tell from what source attack is likely to emanate or in what quarter it may be necessary to institute an action to defend his professional character and reputation.

(*c*) The sums awarded in damages against practitioners for proved negligence are increasing in amount.

(*d*) Careful handling of cases in the early stages may often cut short an expensive legal action.

(*e*) The premium is so small and the financial risk so large that it is nothing but foolhardiness for any practitioner to remain outside a defence organization.

(*f*) Practitioners who join such an organization are assisting in building up a fund to maintain and support important professional principles when these are assailed by litigants, a position which cannot be attained except by collective action.

PRACTICAL NOTES

THE CLINICAL USE OF DIURETICS

THE indications for, and relative value of, the various diuretics are reviewed by J. M. Hayman, Jr. (*Journal of the American Medical Association*, December 12, 1936, cvii, 1937). Diuretics are drugs used to increase the volume of urine. This presupposes the kindeys to be in such a condition that the formation of urine is possible; there must be at least a certain degree of parenchymal integrity, a sufficient blood-pressure and an adequate blood flow. These facts are frequently overlooked, and attempts made to increase the flow of urine by diuretics when they are bound to fail. Diuretics do not cause either a chemical or biological revolution in the body, but work through existing mechanisms. Recent work has produced agreement that the formation of urine depends upon a first separation in the glomerulus of a protein-free filtrate of plasma containing all the soluble substances present in plasma in the same concentration. This filtrate then passes down the tubule and is concentrated by the re-absorption of water by the tubule cells. Hence a diuretic must in general act in one of two ways. It may increase the volume of glomerular filtrate or decrease the re-absorption of water in the tubule. Increase of glomerular filtrate is produced by the caffeine or xanthine group, and by digitalis in cases of congestive failure. Decrease of water re-absorption is caused by urea and the acidifying salts such as ammonium chloride; it is best shown, however, in the action of the mercurials of which salyrgan and mercupurin (novurit) are the most effective and least toxic. The most advantageous diuretic to use in any given case will depend on the condition of the kidneys and which of the foregoing processes, filtration or re-absorption, can be varied to the greatest degree. Hayman bases his conclusions on a study of 213 patients with œdema. In congestive heart failure filtration may be increased, and marked diuresis achieved, by circulatory improvement resulting from rest, digitalis and tapping of thoracic or abdominal collections of fluid; at the same time striking diuresis from inhibition of re-absorption may result from the use of salyrgan or novurit, the latter being slightly more effective. In the œdema of acute nephritis diuretics have no place as they cannot be effective until the endothelial swelling of the capillary tufts has diminished, and they may do harm. Fluid restriction and a low salt diet is indicated. In subacute or chronic glomerular nephritis with œdema, unless of the "nephrotic" type, diuretics are again of little value; the mercurials are dangerous. In the nephrotic syndrome in which œdema is associated with massive albuminuria, low plasma-proteins, normal blood-nitrogen and high cholesterol, Hayman favours urea as a diuretic. It should be used in doses of 15 to 60 gm. (½ to 2 ounces) daily for three to five days; it is readily soluble and does not cause nausea if administered after meals. In portal cirrhosis the regular use of mercurial diuretics prolongs the intervals between tappings.

PRONTOSIL FOR PYELITIS IN CHILDREN

H. G. Huber, (*Münchener medizinische Wochenschrift*, December 4, 1936, lxxxiii, 2014) claiming that the indications for prontosil continue to be widened, reports the use of this substance in the treatment of pyuria in children, whose ages varied from 8 months to 12 years. The dose of the drug varied from 0·15 gm. three times a day in the youngest to double this dose in the eldest and the duration of treatment varied from five to twenty-five days. It is claimed that improvement in the urinary findings was often found as early as the third day and by seven to ten days the urine was normal in many of the cases. Some of these were acute *B. coli* infections in which good results are to be expected, but the series also included some examples of chronic pyuria in which other methods of treatment such as altering the reaction of the urine, the use of hexamine, dietetic alterations and bladder wash outs, had failed to produce any improvement. The prontosil has been given by the mouth in each case and it produced the usual colouration of the urine and also some staining of the skin. The medicament was very well tolerated and only in one case was there any sickness. Huber also claims that there is a rapid return of appetite and general well-being in the cases treated in this way.

INSOMNIA AND SUICIDE

From an analysis of nearly 5,000 common cases of suicide in New South Wales from 1913 to 1929, S. J. Minogue (*Medical Journal of Australia*, October 31, 1936, ii, 598) concludes that in a great majority the actual suicide was preceded by a period of insomnia of short or long duration. He has therefore paid particular attention to this symptom and he concludes that the risk of suicide could be enormously decreased if sleep could be induced. He quotes a favourite and well-tried mixture for the purpose of reducing restlessness and sleeplessness in a patient who is suffering from great psychological worry and strain:—

℞	Potassii bromidi - - - - - -	10 to 15 grains
	Chloralis hydratis - - - - - -	10 to 15 grains
	Tincturæ opii - - - - - - - -	10 to 15 minims
	Infusum gentianæ compositum - - -	to half an oz.

Half an ounce three times a day.

Such patients are given absolute rest in bed and in the early stages of treatment it is recommended that 20 grains of sulphonal be given about 6 p.m. for three or four nights. If the patient still does not sleep, 120 minims of paraldehyde may be given three or four hours after the sulphonal and if sleep is not forthcoming after this a combination of hyoscine hydrobromide (1/100 grain), morphine sulphate (1/4 grain) and atropine sulphate (1/120 grain) by injection is found most useful.

RELIEF OF PAIN IN LABOUR

THE use of paraldehyde in the relief of labour pains has been reported on by several workers and its safety is definitely established. On the other hand there is some difficulty in securing retention of the drug in the rectum and an improved method of use is now brought forward by H. F. Kane and G. B. Roth (*Journal of the American Medical Association*, November 21, 1936, cvii, 1710). By means of benzyl alcohol these workers secure some local anæsthetic effect upon the mucous membrane of the rectum until the paraldehyde mixture has been absorbed. Thorough cleansing of the lower part of the bowel and rectum is first carried out and then the required amount of paraldehyde—0·12 c.cm. per lb. of body weight—with the addition of 1·5 c.cm. of benzyl alcohol is instilled by gravity into the rectum by means of a funnel and large catheter. This is followed by 30 c.cm. of normal saline and the bulk of the injection is so small that it can be made between two contractions. The paraldehyde mixture is given as soon as the patient complains of pain and a full dose may be repeated if necessary 1½ hours after the first and it is found that the intervals between repetitions become longer and longer. If the patient is awake 1¼ hours after the first dose of paraldehyde ¼ grain of morphine is given subcutaneously. One precaution is stressed by the authors, namely that catheterization of the bladder must be carried out every eight hours since no consciousness of bladder distension is retained. E. Solomons reports (*Irish Journal of Medical Science*, December, 1936, 746) on the use of sodium pentothal for which he claims that given intravenously it is a safe anæsthetic for both mother and child and is suitable in either hospital or private practice. He suggests that a 5 per cent. solution should be used and of this 10 c.cm. are sufficient for completion of incomplete abortions, 15 c.cm. for delivery by low forceps and about 18 c.cm. for high forceps.

THE TREATMENT OF PAINFUL SCARS

IN the course of a valuable and detailed study of the causation and investigation of pain in association with cutaneous scars, R. Leriche (*Progrés médical*, January 9, 1937, 49) summarizes the treatment of this condition as follows. He first recommends infiltration locally or of the corresponding regional sympathetic ganglion with novocaine and this is repeated every three or four days. If the pain is relieved in this way this is all that is necessary and it can be renewed from time to time if there is a relapse. If the sedative effect only lasts a few hours and if four or five attempts produce no real diminution in the pain, the next step is to carry out a thorough investigation of possible associated conditions such as syphilis or endocrine deficiencies, the latter being important after ovariectomy, for example. If a good sedative effect is obtained, but is not lasting, then attention must be given to the local situation. It is recommended that the scar be excised and repaired by certain plastic procedures. Along these lines it is claimed that good results are obtained.

INTRAVENOUS CHARCOAL IN THE TREATMENT OF CERTAIN CUTANEOUS AFFECTIONS

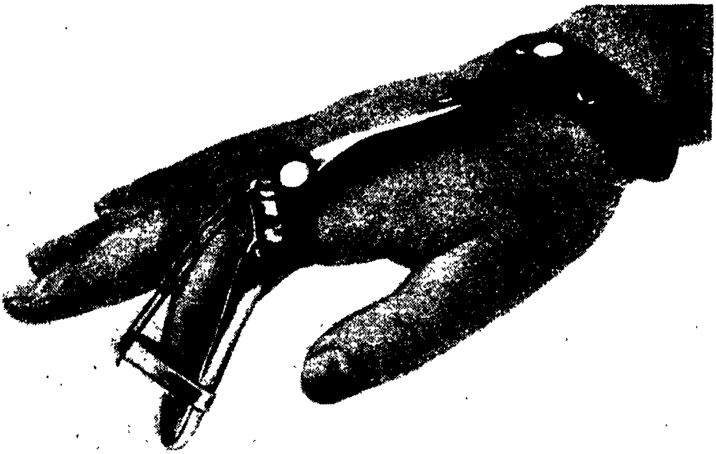
G. B. Cottini draws attention to this method of treating skin diseases (*La Riforma Medica*, November 14, 1936, xv, 1546). The indications for this treatment are in infection processes and intoxication, and it is attended by good results in septicæmia, puerperal infection, impetigo, erysipelas, and especially in complications of gonorrhœa, lupus erythematosis and polymorphous erythema. No contra-indications are met with provided ordinary precautions are taken and there is no danger. Charcoal is given by intravenous injection by doses of 2 c.cm. to 5 c.cm. daily or on alternate days. The technique is simple. After shaking the ampoule to ensure that the liquid is homogeneous the requisite quantity is aspirated into a syringe holding 10 c.cm. After withdrawing some blood into the syringe the amount 2–5 c.cm. of the suspension is injected into the vein. This is quite painless. This method of injecting animal charcoal was initiated by Cochlin of Montreal in 1933.

PROGRESSIVE POST-OPERATIVE GANGRENE OF THE SKIN

J. W. S. H. Lindahl (*St. Thomas's Hospital Reports*, 1936, n.s. i, 185) gives an account of this condition and two cases with two striking illustrations. It is fortunately somewhat rare, affects the skin and subcutaneous tissues, but never invades the muscles, and leaves behind it a tough, black, leathery slough containing the dead skin under which pus exudes over a granulating area. It usually follows an operation complicated by some septic condition, but the operation wound generally heals soundly. Stewart-Wallace collected 37 cases in 1935, and since then about a dozen cases have been published. Meleney suggested that the gangrene was due to a symbiosis of a hæmolytic staphylococcus and a micro-aerophilic non-hæmolytic streptococcus. The condition spreads slowly at the rate of about 4 mm. a day, and eventually may cover about half the body. So far it has been completely unaffected by any ordinary methods of treatment, but Lindahl successfully treated one of his cases by curettage of the edge of the gangrenous area and ionization, a new method which, it is suggested, might have a further trial.

ORTHOPÆDIC TREATMENT OF DUPUYTREN'S CONTRACTURE

THE number of measures suggested for the treatment of Dupuytren's contracture indicates that success does not regularly follow any one of them, and G. Hohmann (*Münchener medizinische Wochenschrift*, December 18, 1936, lxxxiii, 2088), after discussing unsatisfactory results obtained by other methods, suggests a special form of hinged splint which, when worn as illustrated, causes a decrease in the degree of deformity. An elastic band, as shown in the illustration, extends from the circular ring near the end of the finger to a joint on the main body of the splint, proximal to the hinge. A fine tenotomy knife is used to divide some of the fibrous tissue of the palm under local anæsthesia, and in this way since tension is constantly present, the finger is stated to become slowly straightened. The splint is made of aluminium and can be regarded as a form of exercising apparatus. In the early weeks of treatment this is worn day and night and then gradually discarded.



TREATMENT OF FRACTURES IN THE NEW-BORN

FROM the old teaching that mere fixation is sufficient to produce good results in this class of fractures, the current of opinion is swinging through a stage of complete nihilism to an adaptation of modern methods of careful alignment and fixation. A. Thorndike and F. R. Pierce (*New England Journal of Medicine*, November 26, 1936, ccxv, 1013) are strong exponents of the last-named point of view and plead for early diagnosis, prompt realignment of the fragments and a proper fixation until the union has taken place. The types of fixation employed are summarized in the following table :—

Bone	Type of Fixation	Period of Fixation
Clavicle - - -	Figure of 8 with skein yarn - -	3—4 weeks.
Humerus - - -	Axillary pad of wadding ; coaptation splint ; internal angular splint ; or moulded plaster. Swathes.	4—5 weeks.
Femur - - -	Overhead skin traction of both legs on Bradford frame with 2—3 lb. weight.	4—5 weeks.
Tibia, or - - -	Plaster, toes to groin - - -	4—5 weeks.
Tibia and fibula -	,, ,, ,, ,, - - -	4—5 weeks.

An important adjunct to the methods of treating fractures thus advocated is the hygiene and care of the baby's skin. Adequate padding and skin hygiene is essential to avoid the appearance of pressure sores and other complications. It is for this reason particularly that overhead skin traction is advocated for fractures of the femur, since this allows the best care of the skin of the buttocks.

ULTRA-VIOLET LIGHT FOR CHILDREN

In view of the differences of opinion of experts on the value of ultra-violet radiation for children, the conclusions reached by E. Morton (*British Journal of Children's Diseases*, October–December, 1936, xxxiii, 280) are of importance. She concludes that cases of anæmia are definitely benefited by ultra-violet radiation and after twelve or more exposures an increase in the hæmoglobin percentage is found. Debilitated children with listlessness, easy fatigue and loss of appetite are also improved and it is claimed that children with subacute rheumatic pains are also kept free from symptoms by actinotherapy. Children with bronchitis and catarrhal conditions generally are greatly benefited by ultra-violet therapy provided that care is taken with the dosage. Skin diseases of various kinds form another indication for light-therapy and rickets is, of course, very satisfactorily treated in this way. Contrary to certain official statements this author considers that there is no other single form of therapy of such value for the treatment of debility and malnutrition in infancy and childhood.

REVIEWS OF BOOKS

Recent Advances in Orthopædic Surgery. By B. A. Burns, B.CH., F.R.C.S., and V. H. Ellis, B.CH., F.R.C.S. London : J. & A. Churchill, 1937. Pp. 296 and 105 figures. Price 15*s.*

This small and very readable work represents a review of modern teaching about selected subjects in orthopædic surgery. It gives a short and concise account of facts and practice without any tendency to support extreme views. The growth and the chemistry of bone are shortly described, together with the fundamental facts about bone transplantation. It would be an improvement if the practical methods of proved value in bone grafting had been described and illustrated. The chapter on bone tumours is a mere summary of the conclusions of the American writers, but it contains many good illustrations. The modern views about the nature and treatment of osteomyelitis are well summarized, the waiting or even conservative policy in the acute stages being fairly represented. Winnett Orr's method in the chronic stages is described and recommended. The sections dealing with tuberculous joints, arthritis, and congenital dislocation do not call for special comment ; each of them gives a judicious description of modern methods of treatment, with well-selected illustrations. " Painful shoulders " is a good summary of Godman's work, and the chapter on low-back pain and spondylolisthesis contains a valuable description of the methods of diagnosis and treatment, which have been chiefly worked out in America. When a second edition is necessary it would be well to add (i) the treatment of fractures, for surely the modern methods might have been usefully summarized in a single chapter; (ii) the place of " manipulative surgery " ; to both of these subjects a reader might naturally turn in such a book as this for guidance and information.

The Diagnosis and Treatment of Pneumonia. By Campbell P. Howard, B.A., M.D. New York: Oxford University Press. London: Humphrey Milford, 1936. Pp. vii and 373. Price 31*s.* 6*d.*

According to the title-page this volume is reprinted from the series of Oxford Monographs devoted to diagnosis and treatment, edited by Professor Henry Christian of the Peter Bent Brigham Hospital, Boston, Mass. This volume, however, covers much more than its bare title would suggest, for it supplies accounts not only of infection and immunity, morbid anatomy, clinical picture, complications and prognosis of lobar pneumonia, but also of broncho-pneumonia and the common cold in chapters of sixty and thirty-four pages respectively. This is obviously all to the good, for clinically pneumonia and broncho-pneumonia may resemble each other closely; indeed, the author wrote the distinction is at best a pathological one which can be made with safety only in the post-mortem room. The common cold has certain relations with the two infections of the lower respiratory tract. This book is an admirable example of how a subject should be exhaustively set before the reader with facts rather than impressions and the very full bibliographies, three hundred and forty items for the section on lobar pneumonia.

Medical Diagnosis: Some Clinical Aspects. By S. LEVY SIMPSON, M.A., M.D., M.R.C.P. London: H. K. Lewis & Co., 1937. General Practitioner Series. Pp. xi and 244. Price 10*s.* 6*d.*

INTENDED primarily for general practitioners, this concisely written and well-expressed handbook deals in 13 chapters with the bedside diagnosis of the various medical conditions of practice, the "acute abdomen" being wisely included. Due reference is made to differential diagnosis, and to the bearing of tests usually carried out in laboratories for clinical pathology, and an appendix deals with some points in connection with the more important tests. Within a comparatively small space much sound information is conveyed, for example, the tabulation of the causes of tetany, and the remarks on arterial hypertension.

Charterhouse Rheumatism Clinics: Original Papers. Volume I. Oxford University Press, London: Humphrey Milford, 1937. Pp. x and 203. Price 15*s.*

THREE full-length monographs are included in this well-produced volume and each of them brings forward ideas deserving more detailed discussion than can be easily afforded in a brief review. Dr. H. Warren Crowe, for example, in his contribution on "Pathogen Selective Culture and its Bearing on the Classification and Ætiology of Chronic Rheumatic Disease," strikes right at the roots of the difficult problem of the infective agent in rheumatism. His results lead him to subdivide chronic rheumatic diseases into ten groups and many experiments are described undertaken in order to elucidate the rationale of the method; in the words of the summary "this is extremely complex." So also are the details in Dr. Harry Coke's monograph on "The Differential Sedimentation Rate," an excursion into the colloidal systems in the human blood based upon the examination of 2,000 specimens from 1,300 patients. Classification based upon the results of this form of serological examination is shown to agree closely with that made by clinical and radiographic methods. The third contribution by Dr. S. Gilbert Scott on "Spondylitis Adolescens with Associated Pathological Changes in the Sacro-iliac Joints" is easier for the ordinary medical reader to understand, but its conclusions are so startling that further confirmation seems very desirable. It is suggested that a pre-spondylitic syndrome occurs between the ages of 12 and 16, associated with pains in the limbs, thorax and abdomen, with definite changes in the sacro-iliac joints revealed by X-ray examination but without any local symptoms referable to these joints. Like much of the material of this volume this suggestion is provocative and should stimulate further work.

Weight Reduction, Diet and Dishes. By E. E. CLAXTON, M.B., B.S. With Recipes by LUCY BURDEKIN. London: William Heinemann (Medical Books), Ltd., 1937. Pp. x and 199. Plate 1. Price 8*s.* 6*d.*

THIS handy volume is a happy combination of practical directions and details with scientific principles, and that this is so the reader is assured by the authors' acknowledgements to Dr. George Graham and Miss Margery Abrahams, dietitian, of St. Bartholomew's Hospital, and to Dr. R. A. McCance and Miss E. M. Widdowson for their recent analyses of foods. The lay reader is here given a clear explanation of the simple physiological principles which govern nutrition, learns the significance of calories, is presented with sound rules for the control of obesity, and is repeatedly warned that medical guidance is important in the treatment of adiposity. A guarded reference is made to the Hay diet which is based on the assumption that if carbohydrates and protein foods are taken at different meals, the body will benefit and the weight become normal. Useful food tables and recipes occupy more than half the volume.

What is Wrong with British Diet? By HARRY CAMPBELL, M.D. London: William Heinemann (Medical Books) Ltd., 1937. Pp. xiv and 253. Illustrations 24. Price 10*s.* 6*d.*

THE thesis of this book is that nearly all British jaws to-day are ill-developed and that this is caused by a paucity of foods in the national diet compelling vigorous mastication. British food is too soft and leaves the mouth dirty. Harder food and better oral hygiene would put this right. Dr. Campbell deals with this problem in some detail, and although certain of his statements are not altogether scientifically acceptable the general conclusions are sound and careful attention to the advice he offers would do much to improve the nation's teeth. The text is enlivened by drawings of facial types which are regarded as favourable or unfavourable by the author. A superficial resemblance to certain well-known characters adds a special interest to these illustrations.

A Social Problem Group? Edited by C. P. BLACKER, *M.C.*, M.A., M.D., F.R.C.P. London: Oxford University Press, Humphrey Milford, 1937. Pp. vii and 228. Price 15*s.*

THE energetic General Secretary of the Eugenics Society points out, in his admirably critical introduction to the nine essays which make up this interesting volume, that the term "Social Problem Group" originated from the report of a committee, presided over by Mr. A. H. Wood, lately of the Board of Education, on the number of mental defectives in England and Wales and how they could most satisfactorily be dealt with. The existence of such a subnormal mass (10 per cent.) of the population, which supplies criminals, prostitutes, alcoholics, and mental defectives, raises problems ably discussed in these essays. All mental defectives are not a public charge or a social problem, as their parents may be sufficiently well off to make proper arrangements for their welfare. Though the majority belong to the poorer classes, poverty is not in a fundamental relation to the social problem group. Mr. E. J. Lidbetter, who has devoted so much time to the investigation of this subject, writes on the "Social Problem Group as a Public Charge," Dr. Tylor Fox on its relation to epilepsy, Dr. E. Slater on its relation to mental disorder, and Dr. W. H. de B. Hubert on "Recidivism and the Social Problem Group."

History of Modern Morals. By MAX HODANN. Translated by STELLA BROWNE. London: William Heinemann (Medical Books), Ltd., 1937. Pp. xv and 338. Price 12*s.* 6*d.*

THIS clearly-written and well-translated book points out that just as Darwin's theory of evolution was a prominent and burning problem, meeting with opposition from Virchow, in the last century, so in this century, especially since the Great War, have the problems of sex come out into the limelight of open discussion. Indeed, the young science of "sexology," as it is called here with some apology for its hybrid construction, cannot now be ignored or treated successfully with the taboo of the Victorian era. The author covers a wide field, as is shown by the headings of some of the chapters: the fight against venereal disease, the secret of generation, the evolution of the sex consultation centre, the history of birth control, sex education, the fight for legalized abortion, and the analysis of the sex taboo. In the second chapter, entitled "those who are different," the plight of homosexuals is set out, and the career of the late Magnus Hirschfield, a medical man, who in 1895, at the time of Oscar Wilde's trial, was impelled by the suicide of a homosexual patient on the eve of marriage, to take up the subject, is sketched. The last chapter, on "The Patriarchate in Dissolution," deals with the position in Russia where, in June of last year, the legalization of abortion was, after sixteen years, repealed and its place taken by a gigantic programme of subsidies for large families, increased number of maternity homes, crêches and nursery schools. There are, as already pointed out, many other subjects considered in this well-documented work.

A Pharmacopœia for Chiropodists. By J. N. LE ROSSIGIVE, M.I.S.CH. and C. B. HOLLIDAY, M.P.S. London : Faber and Faber Limited, 1937. Pp. 160. Price 5*s.*

IN general arrangement and typography this modest book follows the style of the British Pharmacopœia, and like the senior volume, consists for the most part of monographs on drugs and preparations likely to be of use in chiropody. Sections on surgical dressings, on pharmacological terms and on pharmaceutical procedures complete the book. The information here presented will be found of value by medical practitioners.

St. Thomas's Hospital Reports, Second Series, Vol. I, 1936. Edited by O. L. V. S. DE WESSELOW and C. MAX PAGE, assisted by N. R. BARRETT, J. ST.C. ELKINGTON and A. J. WRIGLEY. London: St. Thomas's Hospital. Pp. 199. Coloured plates 2. Fig. 45. Price 10*s.*

ST. THOMAS'S HOSPITAL reports in its new series have made a complete change in the character of its contents ; recently mainly consisting of, what

Mr. Max Page in a historial introduction calls, " arid statistical tables," it now publishes nineteen interesting original articles which reflect the clinical and laboratory activity of the medical staff. Professor De Wesselow and Dr. W. J. Griffiths discuss the problem whether or not diabetes mellitus has a multiple origin, and bring forward with wise caution evidence of an affirmative character. This is followed by Dr. Card's clinical study of 67 cases of diabetic coma. Professor B. A. McSwiney describes the physiology of the involuntary nervous system, and Dr. Tchaperoff reports the success of X-ray treatment in four cases of Cushing's syndrome. Professor L. S. Dudgeon contributes a valuable article on the demonstration of particles of malignant growth in the sputum by means of the wet-film method, and other well illustrated articles are those on metastatic brain tumours by Dr. Elkington, dermatomyositis by Dr. Dowling, and non-union of the carpal scaphoid by Mr. H. F. Moseley.

NEW EDITIONS

Sick Children, Diagnosis and Treatment by DONALD PATERSON, M.D., F.R.C.P., in its second edition (Cassell and Company, 12*s.* 6*d.*), has been extensively revised and it happily retains its practical outlook together with a successful interpretation of modern advances in pædiatrics. The chapter on blood disorders has been greatly improved and sections on the new-born baby have also been considerably amplified.

The third edition of *Practical Methods in the Diagnosis and Treatment of Venereal Diseases* (E. & S. Livingstone, 15*s.*), has been revised and edited by ROBERT LEES, M.B., F.R.C.P.E., as a tribute to the memory of the late David Lees, the original author. Dr. R. Cranston Low has helped by revising the sections relating to cutaneous manifestations, Dr. W. R. Logan has again been responsible for those sections relating to bacteriology and Mr. R. C. L. Batchelor has revised and rewritten the section on gonorrhœa in women. This work needs no introduction; its practical nature, its details on treatment and its excellent illustrations (especially the coloured plates) have made it one of the most popular manuals on the subject and, on the sure foundations laid by its original author, the recent version has been efficiently produced in a manner deserving warm congratulation to the editor, the contributors and publishers.

DR. ROBERT HUTCHISON's excellent trilogy on the *Principles of Diagnosis, Prognosis and Treatment* has been little altered for its second edition (John Wright & Sons, Ltd., 3*s.* 6*d.*), for indeed it is difficult to believe that there could be any improvement upon the sane and balanced text of its original version. This is a little book which every medical practitioner should be forced to read at some period, preferably early, in his career.

NOTES AND PREPARATIONS

NEW PREPARATIONS

Antihæsin.—The trouble often experienced by the medical practitioner in removing adhesive plaster and, even more important, the discomfort of the patient can be remedied by the use of a new non-irritant, non-inflammable solution called "antihæsin," prepared by Messrs. Allen and Hanburys Ltd., Bethnal Green, London, E.2. The medical and nursing profession will find this new preparation of great value. It is sold in 4 oz. bottles costing 1*s.* 6*d.* Prices of larger quantities on application.

Elixir hæmotone.—This is a pleasantly flavoured preparation containing well-balanced proportions of iron, copper, glucose, and glycero-phosphates. It is recommended in all cases of nutritional iron deficiency anæmia in pregnancy, and it is claimed that two to four teaspoonfuls given daily during the last two to three months of pregnancy prevents any appreciable drop in the hæmoglobin value of the blood at childbirth. It is also indicated in other anæmias calling for intensive iron treatment. It is manufactured by Duncan, Flockhart & Co., Edinburgh and London (155, Farringdon Road, E.C.1), from whom further particulars may be obtained.

Iodatol.—This is an iodized oil specially prepared to contain 40 per cent. of iodine for use in radiological diagnosis as a contact medium after introduction into, for example, the bronchial tree. A weaker preparation (10 per cent. iodine) can be used for therapeutic purposes by injection or by the mouth in a strength of 25 per cent. The British Drug Houses Limited, Graham Street, City Road, London, N.1, are the manufacturers of Iodatol and a sample will be sent to any practitioner on request.

Ovarian hormones.—In order to describe the indications for the new products "ovostab" (œstrone benzoate) and "luteostab" (corpus luteum hormone) Messrs. Boots Pure Drug Co., Ltd., Station Street, Nottingham, have issued a booklet entitled "Ovarian Hormones in Clinical Practice" and copies may be obtained by medical practitioners on application.

Prophyll atomiser.—A new type of atomiser for which it is claimed only one hand is required is now manufactured by Prophyll Co., Ltd., 7, Princes Street, London, S.W.1. A popular model costing 4*s.* 11*d.* and the "parozan" model costing 7*s.* 6*d.* are available for spraying the nose and throat (for which a special solution known as Prophyll No. 1 is recommended) or the eyes can also be sprayed using a lotion known as Prophyll No. 2. It is claimed that this new atomiser is particularly useful for travelling as its contents cannot spill.

Sulphonamide.—Various preparations of para-aminobenzenesulphonamide are now available for oral administration to patients suffering from infection by the hæmolytic streptococcus, and some have already been noted in these columns. The British Drug Houses, Ltd., Graham Street, City Road, London, N.1, have sent samples of tablets of "Sulphonamide—P, B.D.H.," each containing 0·5 gramme of the pure substance and available in bottles of 25 and 100 tablets. Samples will be sent to any member of the medical profession on request.